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Nervous and Mental Diseases

Peter Bassoe

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VOLUME X.

NERVOUS AND MENTAL DISEASES

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NERVOUS DISEASES.

SYMPTOMATOLOGY.

The Babinski Sign is Present Only When the Leg Fibers are Implicated. This thesis is formulated by Potts and Weisenburg[1] in connection with the report of a well-studied case of a small tumor, measuring 18x20 cm. and involving the arm center on the right side of the brain. When first observed the patient's only complaint was loss of power in the left arm. A week later he had an attack of unconsciousness and violent spasmodic movements of the left arm and face. At this time there was no appreciable weakness in the left leg, but the left knee-jerk was slightly increased. The ankle-jerks were equal and normal, and there was not a Babinski sign on either side, all of the toes becoming flexed on tickling the sole of the foot. A week later distinct weakness of the left leg had set in, and a typical Babinski sign was obtained. Twelve days later operation was attempted but could not be completed on account of the patient's condition, and he died a few hours later. The tumor was found to occupy the upper portion of the precentral convolution and caused some separation of the precentral and postcentral gyri so as to make the Rolandic fissure very prominent. (See Plate I.) The tumor was a carcinoma secondary to carcinoma of the esophagus.

"The most interesting feature of the case was the development of the reflex hyperexcitability, and especially the Babinski reflex. It is fortunate indeed that opportunity was given for accurate observation. When the patient was admitted he had weakness in the left arm only, which weakness later extended to the face

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(1) Rev. Neurol. and Psych., 1910, p. 576.

and the masseter, the tongue escaping. Power was entirely lost, but the limb was rigid and the triceps, biceps and wrist-jerks were much increased. At first the left knee-jerk was slightly increased, the Achilles-jerk being normal, while the plantar reflex was sluggish, the toes flexing normally. Gradually there developed a hypertonicity of the left leg, and the great toes of both feet assumed the position of hyperextension, the other toes extending at the first phalanges, the second and third being flexed. This, however, was more marked in the left leg. At this time also the rigidity of the left arm was much greater. Two days later it was observed that the left leg was weaker than it previously had been and that irritation of the plantar surface then caused a dorsal flexion of the great toe for the first time. In other words, in view of the necropsy finding, it is evident that the subcortical fibers of the leg were first irritated, there resulting first an increase of the patellar jerk, later hypertonicity of the whole leg with extension of the large toes on both sides but especially on the side opposite the lesion; and as there gradually occurred a destruction of fibers, there appeared a weakness in the related limb with a greater reflex excitability and hypertonia and the presence of the Babinski phenomenon. It is evident, then, that the Babinski reflex occurs only in those cases in which the leg fibers are implicated, and that it should not be looked for when the arm or face fibers alone are diseased; and yet, simple as this fact seems, this has not been previously recognized. Not only that, but it is evident from the gradual development of the reflexes and hypertonicity, that the Babinski reflex occurs only when the fibers in relation to its arc are implicated. For example, in this case there was first present an increased patellar jerk, then hypertonicity of the whole limb with hyperextension of the great toe and finally the Babinski reflex appeared. This teaches that an increase or the presence of a particular reflex like the patellar or the Babinski occurs only when the motor fibers in relation to its particular arc are involved.

"We have no desire to refer to the voluminous literature on the Babinski phenomenon and we will only refer to the last paper which deals with this subject. Bergmark,[2] in an excellent paper on cerebral monoplegia, discusses the occurrence of the Babinski reflex in cortical lesions and states that there are undoubted cases of cerebral paresis in which this reflex is absent. He further states that this sign did not appear in 7 out of his 18 cases of cortical disease. An analysis of these cases, however, most of which are clinical, shows that the leg was not involved. In 4 cases in which the Babinski sign was present there was paresis of the leg. This in general is what we found in other similar cases in the literature. The above facts explain the many instances of motor lesions in which the Babinski reflex has been absent, and also have a direct bearing on its elicitation. Since its original description, there have been many methods described which produce extension of the large toe.

"The fact of the matter is, that in the usual motor lesion in which the leg fibers are involved, the Babinski reflex can be obtained only by plantar excitation, because the irritation in such case is directly in its arc. In the more severe cases—that is, those in which all the leg fibers are implicated or in which there is a cortical or subcortical irritation of the leg fibers—it is possible to obtain extension of the large toe not only by plantar irritation but by irritation of any part of the leg below the knee and sometimes even of the thigh. In fact in such cases any movement of the lower limb, as flexion of the thigh on the abdomen, will cause an extension of the large toe and, as was present in this case, it is not unusual to see permanent hyperextension of the large toe preceding the actual demonstration of the Babinski sign."

The External Malleolar Sign is the name given to a reflex recently discovered by C. G. Chaddock.[6] It consists in extension or flexion of one or more or all of the toes, with or without fanning of them, when the external inframalleolar cutaneous area is irritated, in cases of

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(2) Brain, 1910, p. 342. See *Practical Medicine Series*, 1910, vol. 10, p. 63.

(6) Interstate Med. Jour., July 7, 1911.

organic disease of the spinocortical reflex paths. This sign is naturally of the same significance as the Babinski sign, indicating degeneration in the upper motor neurones. Chaddock found that the new sign is the more delicate of the two, that it sometimes appeared before and remained longer than the Babinski sign. On the other hand he never failed to elicit the external malleolar sign in the presence of a frank Babinski sign, and he has never seen it in a normal individual. The observations are based on the study of 245 cases. The appearance of a positive reflex and the method of obtaining it are seen in Plate II.

The author states that the degree of irritation should be varied. In some cases the merest touch is sufficient to excite the sign; in others rather severe scratching may be required. The author uses a moderately pointed nail-file. Usually the most sensitive point is a slight depression just in front of the lower point of the external malleolus and behind the tuberosity of the cuboid, but sometimes the movement occurs more readily when the posterior groove is scratched.

A New Method for Eliciting the Ankle-Jerk. Hitherto the best method for obtaining the Achilles tendon reflex has been thought to be to place the patient in the kneeling position, and then to tap the tendon with a broad hammer. Now Althoff[7] recommends having the patient sit on a chair with the knees at an angle of 110° to 120° and the feet in the region of the cuboid and cuneiform bones, supported by a footstool about 9 inches high with the upper surface 2½ inches wide and rounded to both sides. Now the tendon is tapped, and the position is claimed to give the proper tension to the muscles so as to bring out the reflex if it is obtainable at all.

"Inversion" of the Wrist Reflex. Ordinarily, on tapping the lower part of the radius, flexion of the elbow is produced by contraction of the supinator longus muscle. If the reflexes in the arm are increased, as in cerebral hemiplegia there may also be associated flexion of the fingers. By "inversion" Babinski[8] designates

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(7) Münch. med. Wochenschr., 1911, Nr. 2.

(8) Bull. et Mem. de la Soc. méd. des Hôp. de Paris, Oct. 14, 1910.

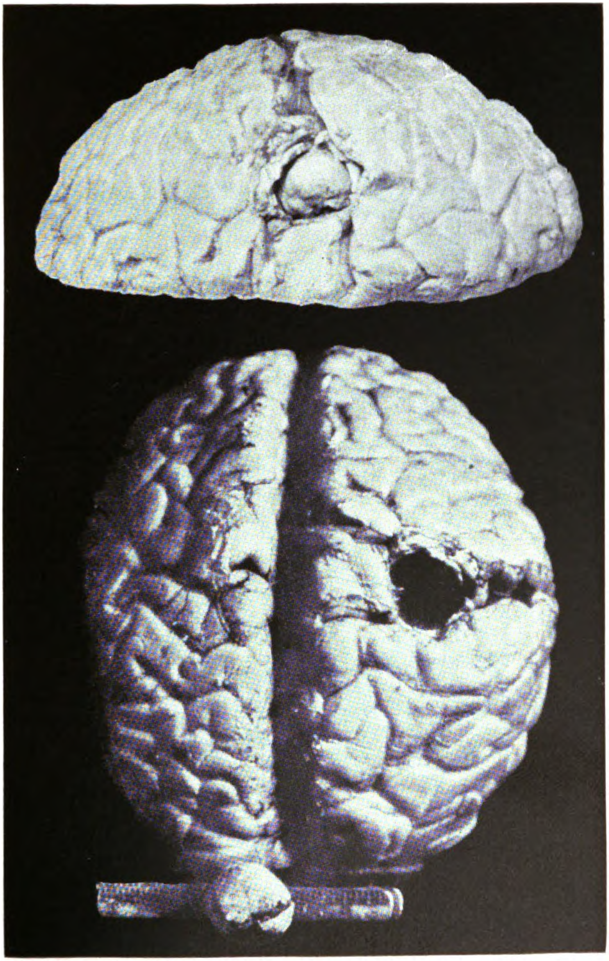

PLATE I.

Tumor limited to the arm center.—Potts and Weisenburg.
(Page 5.)

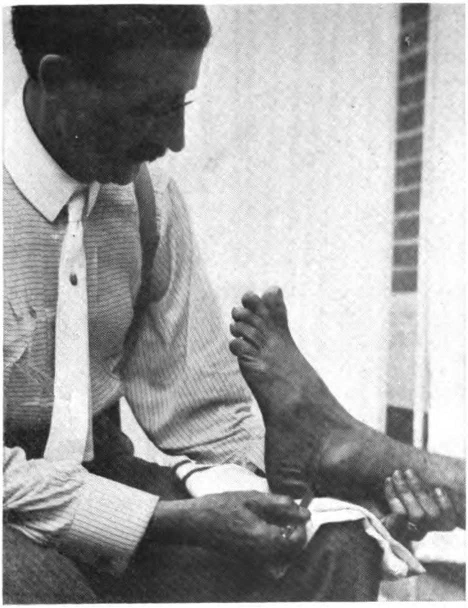

PLATE II.

Method of eliciting the external malleolar sign.—Chaddock.
(Page 7.)

the occurrence of the flexion of the fingers alone, without flexion at the elbow, a phenomenon which never occurs in health and which he finds only exists in cases of lesions of the cervical cord. Claude and Velter[9] have confirmed this in a case of syringomyelia and Babinski[1] himself had occasion to have verified by operation the diagnosis of tumor compressing the fifth cervical segment of the cord in a case where this "inversion" existed. André-Thomas, however, has observed it in a case of muscular dystrophy where, of course, a lesion of the cervical cord is unlikely, but as the supinator longus was extremely atrophic the absence of flexion of the elbow in this case does not seriously invalidate Babinski's contention.

The Diagnostic Value of the Vibration Sense is discussed by R. T. Williamson[2] who used a tuning-fork 7½ inches long, marked 440, Al. As to the conduction of the vibrating sensation, it appears that it passes along paths which do not cross in the cord, because in cases of unilateral lesion it has been lost only on the side of the lesion below the level of the disease. In a case recorded by Bing[3] of an extradural unilateral fibrosarcoma in the cervical region of the cord, there was loss of pain and temperature sense and impaired tactile sense on the side opposite to the lesion. On the same side there was loss of the vibrating sensation while other sensibility was intact. It also appears as if the vibration sense is not conducted upwards in the central gray matter of the cord like the pain and temperature sense. In one of Bing's cases of traumatic hematomyelia there was no diminution of the vibration sense although the pain and temperature sense were greatly impaired, and, post-mortem, the gray matter was found to be entirely destroyed at the seat of the lesion. Williamson made a similar observation in a case of syringomyelia. Bing assumes that the vibration sense is probably conducted upwards in the posterior columns, and this is confirmed by the fact that in some cases of early com-

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(9) Rev. Neurol., 1910, p. 601.
(1) Ibid, p. 602.
(2) Review of Neurol. and Psych., August, 1911.
(3) Neurol. Centralbl., 1910, p. 173.

bined degeneration the vibration sense was found to be lost together with impairment of the muscular sense, while other forms of sensation were normal.

As to the condition of the vibration sense in various nervous diseases, Williamson often found it lost very early in various forms of multiple neuritis when other forms of sensation were normal. The same was sometimes found true in the early stages of tabes and compression of the cord from caries or tumor, in spinal syphilis and multiple sclerosis. As stated above he found it lost together with impairment of muscular sense in cases of early combined degeneration, and in a case of multiple sclerosis there was loss of the vibration sense and muscular sense together with astereognosis in the left hand. He has not met with any case of brain disease in which the vibration sense was affected alone or before other forms of sensation.

Impairment of the vibration sense is of great diagnostic value when all other sensation is normal as indicating that we are not dealing with a disease strictly confined to the motor system. The author has never found it impaired even at an advanced stage of such diseases as amyotrophic lateral sclerosis, primary lateral sclerosis, progressive muscular atrophy, acute anterior poliomyelitis and paralysis agitans. When the other symptoms point to one of these diseases, loss of the vibration sense is an indication that we are dealing with some other disease which involves sensory tracts also. Hence loss of vibration sense may by very helpful in the differential diagnosis between acute poliomyelitis and multiple neuritis or between one of the other motor diseases mentioned and multiple sclerosis.

In hemianesthesia due to organic disease the vibration is felt when the foot of the tuning-fork is placed on either lateral edge of the sternum. If it is not felt on the lateral edge on the anesthetic side the case is probably one of hysteria or malingering. On the other hand it may be felt on both sides of the sternum in a case of hysterical hemianesthesia. The author has also found the vibration sense of value in other forms of hysteria or malingering.

The Causes of Certain Types of Paralysis. Siegmund Auerbach,[4] of Frankfurt, who evidently has been under the influence of Edinger, has occupied himself for years in studying the factors which determine the involvement of certain muscles and groups of muscles in paralysis due to different causes. In 1904 he observed that a waiter afflicted with alcoholic neuritis had a rather unusual distribution of the paralysis, and that the muscles paralyzed were those most subject to fatigue in his work. Möbius and others have made similar observations in cases of lead neuritis, to the effect, that the muscles most used become affected first and recover last.

Auerbach enumerates the following physical, physiologic and anatomic factors which influence the working conditions and consequently the exhaustibility of muscles:

1. The overcoming of the force of gravity is a constant factor with certain muscles, such as those which support the head, raise the arm and flex the hip.

2. The direction in which the muscle moves. Aside from the relation to the force of gravity it makes a difference whether a muscle acts along the median axis of the body or at an angle to it. Thus, the work done by adductors and abductors is greater than that done by the flexors.

3. The functional relationship to another and stronger muscle group. In this case a muscle is naturally less prone to fatigue than if it were wholly dependent on itself.

4. The frequent or rare exercise of a function in everyday life without reference to occupation. In a general way functions rarely called upon are more readily lost than those in constant activity. Thus taste and smell are more readily exhausted than vision, and the tendon reflexes which are related to deep muscle sense can hardly be exhausted while the superficial reflexes which are related to tactile sense become exhausted quickly.

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(4) Samml. klin. Vorträge (Volkmann), Nos. 633 and 634, 1911.

5. The phylogenetic factor. Certain muscles which in other mammals are in constant use in a general way have greater resistance than those which have become trained to special functions in man. On account of the erect position of man certain muscles are rarely called upon to act and consequently are easily exhausted.

6. When muscle groups on both sides of the body habitually work together they are generally represented in both cerebral hemispheres, a point of particular importance in focal brain lesions.

7. The blood supply and the number of innervating nerve fibers generally have a direct relation to the muscle volume and hence require little special attention.

8. The unfavorable anatomic position of certain nerves often affects the muscles dependent on them unfavorably, especially on account of their great liability to injury.

Auerbach reviews recent work on muscular action, particularly that of Teleky.[5] The latter determined the weight of single arm muscles in children and adults and computed their ratio to the total musculature of the upper extremity. The flexors and extensors of the forearm naturally are particularly prominent (respectively 35.3 and 26.2 per cent.); further the long flexors of the fingers, (11.1 per cent.). Of very inferior strength are the long extensors of the fingers (3.1 per cent.) and the pronators (3.4 per cent.). The extensors of the hand (6.1 per cent.) are considerably stronger than the flexors (4.4 per cent.). However, the extensors of the hand work under much more unfavorable conditions as they have to overcome the force of gravity, and they constantly have to extend the hand in order to allow full action of the long flexors of the fingers, as for instance in shutting the fist. The flexors of the hand work against gravity only when the hand is in full supination, and they are constantly aided by the flexors of the fingers. The interossei and lumbricales which nearly equal the long extensors of the fingers in weight, work under more favorable conditions. Teleky comes to the conclusion that the human arm is principally constructed

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(5) Deutsche Zeitschr. f. Nervenheilk., Vol. 37, p. 232.

for coarse and heavy work and that in fine work the hand and finger muscles are subject to undue strain.

The application of these considerations to lead neuritis is very interesting. The constant involvement of the long extensors of the hand and fingers is explained by their liability to overwork and exhaustion, and the escape of the supinator longus is due to its relative strength and the aid it receives from the whole group of flexors of the elbow. Similarly, the small finger muscles (aside from those of the thumb) escape or become involved only late in the disease because they act under favorable conditions and are supported by the powerful long flexors. The author finds this explanation much more satisfactory than the dogma of special susceptibility on the part of certain nerves, or the old theory of Hitzig, advanced in 1868, that the blood from the extensors has to pass through a common venous trunk, the external interosseous trunk, where stasis is apt to occur.

In other forms of multiple neuritis it is common for the supinator longus to escape while the extensors of the hand and fingers are most severely involved, which is readily accounted for by the considerations given above, while the doctrine of special susceptibility, of certain nerves is unsatisfactory as the supinator, like the extensors mentioned, is supplied by the musculospiral nerve. Similar considerations explain why, in the leg, the tibialis anticus muscle generally escapes while the other muscles supplied by the peroneal (external popliteal) nerve are paralyzed. The greater involvement of the extensors of the toes as compared with the flexors is explained by the former constituting 41 per cent. of the leg musculature, as against 63.5 per cent. for the flexors, and their having to work against the force of gravity.

Applied to the cranial nerves this theory explains why in paralysis of the recurrent laryngeal nerve the abductors of the glottis suffer before the adductors, because the former have to contract constantly while the latter act only in phonation. Furthermore the weight of the abductors (crico-arytenoideus posticus) was found to be 82 mg. as against 182 mg. for the combined adductors. The frequency of paralysis of the external rectus from various causes as compared with paralysis of other external ocular muscles is also explained by its greater work in having to pull the eyeball away from the median line. Of course Auerbach realizes that in many cases the vulnerability of the external rectus depends on the long course of the abducens nerve at the base of the brain. Of the many muscles supplied by the oculomotor nerve, the constantly working levator palpebræ and the sphincter of the iris are most frequently involved. In myasthenia, ophthalmoplegic migraine and congenital ophthalmoplegias the levator palpebræ is also the eye muscle most frequently affected.

Auerbach ventures to apply his theory to the muscular atrophies. In the idiopathic form, or muscular dystrophy, which generally begins in childhood, the proximal muscles such as the gluteals, trapezius, pectoralis major and latissimus dorsi are apt to be mainly affected. The first named muscles are especially concerned in erect locomotion, a late phylogenetic acquisition, and the other muscles are very poorly developed in childhood. On the other hand, in the progressive muscular atrophy of spinal origin, a disease of middle life, the small finger and hand muscles, which we have learned are under unfavorable conditions in most workers, are first affected. That the element of muscle susceptibility predominates over any hypothetical special nerve susceptibility is made plain to Auerbach by the fact that in that form of spinal muscular atrophy which occurs in early childhood (Werdnig-Hoffmann type), the distribution is that of muscular dystrophy, not that of the analogous spinal disease in adults.

In connection with the ordinary hemiplegia from brain lesions it is pointed out that the leg usually improves more rapidly than the arm, and that in the leg it is particularly those muscles which shorten the limb which remain weak, namely, the flexors of the thigh and leg and the dorsal flexors of the foot. The author finds here also that his theory holds good and that in the thigh the weight-ratio between the weaker flexor group and stronger extensor group is as 1,166 to 851 and, furthermore, the flexors work against the force of gravity. The same considerations hold for the leg, and here the disproportion is still greater. In the upper extremity the opposition of the thumb is particularly weak while the strong muscles which close the hand usually retain some power and cause contracture.

Nervous Diseases as "Reflex Symptoms." W. M. Leszynsky[7] deals severely with those who still adhere to the exploded ancient reflex theories. "Among the notable medical fallacies, none have been more prominent and persistent than that of attributing seemingly obscure nervous manifestations either to some reflex irritation originating in the female genitalia, or to so-called imbalance of the ocular muscles. In the majority of instances, the causal relationship cannot be satisfactorily established except in the fanciful minds of those with preconceived notions.

"Absolutely authentic cases are extremely rare. In this connection it may be of historic interest to mention that soon after the advent of antiseptic and later aseptic surgical technic, the sacrifice of normal ovaries became extraordinarily and alarmingly frequent. Oöphorectomy was unsuccessfully practiced for the cure of neurasthenia, hysteria, hypochondriasis, epilepsy and insanity. Of course, in many cases such surgical interference was looked upon and condoned as a *dernier ressort*, but the conclusions as to etiology were based upon false premises. Although the pendulum is still swinging, such unwarrantable surgical mutilation is gradually but rapidly coming to a halt."

The author has made considerable study of eye symptoms in functional nervous cases, and says: "As the result of my observations, and from subsequent investigation, I have reached the conclusion that muscular anomalies producing latent diplopia and unconscious efforts to maintain binocular single vision are undoubtedly a drain upon the nervous energy, often aggravating if not producing many neurasthenic and psychasthenic phenomena. But I am yet to be convinced that such is

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(7) Boston Med. and Surg. Jour., Feb. 2, 1911.

the cause of chorea, epilepsy or any other constitutional disease of the nervous system. As to published reports of cases of chorea, epilepsy, insanity, etc., having been cured by the surgical adjustment of ocular muscles, I have no desire to question the judgment or veracity of certain observers, but many of the cases thus reported will not successfully bear critical neurological analysis. To assert that patients have recovered from these neuroses after oöphorectomy, or after the correction of ocular defects, or cauterization of the nasal mucous membrane, urethra, etc., is begging the question, and does not necessarily imply that such affections were of reflex origin. In many cases the alleged rapid (but usually temporary) recovery has been due to suggestion, and the same result may often be accomplished by simpler and safer means. In psychasthenic and impressionable individuals, many so-called reflex symptoms may be initiated or fostered by suggestive physical examinations or injudicious remarks of the attending physician.

NEUROSES.

PSYCHO-ANALYSIS.

The Psycho-Analytic Method of Treatment, Based on Freud's Doctrines of Suppressed Sexual Complexes, was dwelt on at some length in the *Practical Medicine Series,* 1910, Vol. 10, p. 22. A huge literature on this subject has already sprung up, and new journals devoted entirely to it have been founded. Naturally the method meets with both favor and disfavor. Even most opponents admit that it is of theoretical value. Thus A. Friedländer,[8] of Frankfort, summarizes his views as follows:

1. We do not possess a therapy equally applicable in all cases of hysteria.
2. The cathartic method of Breuer and Freud has, from the theoretical standpoint, been very fruitful for the psychology of hysteria; it is of practical value in certain cases of traumatic hysteria. The association

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(8) Jour. Abnormal Psych., February, 1911.

studies of Jung and others deserve critical consideration.

3. The psycho-analytic method is surely not the only one that is of value in the treatment of hysteria, neurasthenia or obsessions. In so far as the method is connected with the detailed discussion of sexual matters and perversities it is justly rejected by many authors.

4. Psychic treatment, as it is practiced by those who do not belong to Freud's school, accomplishes as much as psycho-analysis, but it must be aided, according to the particular case, by general therapeutic measures applicable to functional neuroses and psychoses. (Training in work, hydro- and electrotherapy, dietetics, etc., and under certain conditions, hypnosis.)

5. The procedure of those authors who carry on a propagandum in lay journals about this method of treatment, which at best is not proven and which is rejected by many, deserves emphatic disapproval.

Among the most prominent opponents of the method is Aschaffenburg who, according to Friedländer, has stated in the clearest possible manner all that might be said against Jung's views. He completely denies the possibility of the results of the forced psycho-analysis. The fact that Freud and his disciples invariably find sexual complexes is attributed by him to forced associations. He does not agree with Löwenfeld that Freud's material is of a special type, or that the population of Vienna is particularly inclined to sexual matters. Both Aschaffenburg and Friedländer believe that Freud's method is prone to lead us astray as, according to the former, it directs the attention to the sexual life, and a sexual meaning is given to harmless words. The same author further states: "The method is inaccurate for most cases, objectionable in many cases and unnecessary in all cases."

Alt stated that he could not give an opinion of the method but that he would strongly advise against its use in hysterical patients, many of whom are, without it, inclined to make the physician a confidant about their sexual life. Neurologists have with their honest explanations succeeded in gradually eradicating from the popular mind the notion that hysteria in due to unsatisfied sexual desires. But Freud's work has once more thrown the ban upon the poor hysterics. A delicate questioning is of grave danger both to physician and patient. He consequently feels himself in duty bound to warn patients from entering any institution where the physician follows Freud's method of examination and treatment.

Friedländer is inclined to agree with Löwenfeld that there is a local reason why Freud's Vienna school always finds a sexual basis. He points to the intimate scientific relations which existed between Freud and Weininger. The popularization of their ideas, like the unfortunately extensive reading of Krafft-Ebing's *Psychopathia Sexualis* by the laity, causes the patients to come "prepared" to the office for treatment, the principle of which is already known to them. He says: "I do not maintain that all cases are under the influence of auto-suggestion when they come for the pyscho-analytic treatment. What I maintain is that they either know or suspect the method which will be used upon them or that after a short time they are suggestively influenced by the questions. It cannot be said that they are not questioned. When they relate their dreams they are asked if nothing else occurs to them; their falterings and hesitations are interpreted as resistances that must be overcome. The examiner in question must find something in accordance with his scientific convictions; he seeks—and he finds. That many of the patients feel relieved by their utterances we all agree, even if our opinions otherwise differ from those of Freud and his pupils." He goes on to say that any physician whose personality invites the patient's confidence will be able to cure cases of psychoneuroses, and that suggestion is to some extent a secret remedy which can neither be taught nor acquired. An otherwise skillful physician may not possess the power of suggestion, while on the other hand a bungler may possess it in a high degree. He brands as unscientific and as evidence of lack of familiarity with the literature the claims by some of Freud's enthusiastic followers that no cases of hysteria or obsessions were cured before the introduction of Freud's method.

[We wish to warn the reader that extreme skepticism is in order when claims are made for the "specificity" of any therapeutic method, the chief successes of which have been achieved in cases of hysteria. It is well to recall how the imitativeness and suggestibility of hysterical patients led such an acute observer and thinker as Charcot astray as to the natural frequency of certain features of the hysterical attack and the hysterical stigmata, and as to the diagnostic and therapeutic importance of hypnotism.—Ed.]

Oppenheim's Views on Freud's Doctrines deserve serious attention on account of his recognized place as a leader of neurological thought. He made them perfectly clear in a denunciation almost as vehement as that of Hoche a year previously (See *Practical Medicine Series,* 1910, Vol. X, p. 26). Oppenheim[9] analyzed the Freudian theories in an address on anxiety neuroses before the *German Neurological Society* at its Berlin meeting in October, 1910. He began by stating that he had read all of the literary productions of Freud and his adherents, which he found a most nauseating task. He gives a long list of innocent objects, such as cane, sausage, finger, umbrella, apple, orange, candle, sponge, match, which when figuring in the dreams or thoughts of the patient, to the imagination of the Freudian adherents become a symbol of the penis. A full bookcase is a very potent man. *"Träumt jemand von einem Zimmer, so ist es ein Frauenzimmer."* He apologizes for mentioning these absurdities, but it is necessary to utter a warning and to realize that under the flag of science and medical art a propagandum is being made for an altogether objectionable and dangerous mode of treatment. He dwells on the harm a physician may work in the soul of a patient entrusted to his care when he is convinced that there is only one etiologic factor, that of sexual wrong-doing, and prowls around in the subconscious life of the patient and arbitrarily so interprets his dreams and utterances as to bring the sex-

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(9) Deutsche Zeitschr. f. Nervenheilk., Vol. 41, p. 179.

ual factor to the foreground. He compares the method of questioning to that of medieval torture and pictures how the victim at first rebels against the sexual interpretations but finally gives up in despair and accepts the torturer's explanation. Oppenheim ends with a demand that physicians in charge of sanitaria and other institutions for nervous patients in their circulars openly state whether or not they use this method so that those opposed to it may be able to protect their own patients from being subjected to it.

A Case Cured by Psycho-Analytic Treatment is thus related by Alfred Gordon.[1] "In a young lady of good intelligence and education, four years ago, various symptoms of psychasthenia developed. The sense of physical exhaustion was the basis of the affection, and on this foundation multiple mental manifestations made their appearance at various intervals. Phobias, impulses, the most peculiar wishes, obsessions of a hallucinatory character, all alternated during a period of two years. During the entire third year of her miserable existence she feared that she "was losing her mind," to use her own expression. She was consequently unable to entertain her friends, unable to read, or otherwise spend her time usefully. She was obsessed by the idea that she would be ridiculed by her friends if she attempted to converse with them, as she feared she would not to able to understand them and to make herself understood. Accordingly she isolated herself and spent the time in worrying over her future. The patient was given every opportunity for improvement. Rest in bed for prolonged periods, massage, hydrotherapeutics, excellent food, proper surroundings in every sense of the word, continuously kept-up suggestive methods—were all tried simultaneously. The case seemed to be unusually obstinate and, except for a few intervals of apparent amelioration of the morbid manifestations, it eventually became uncontrollable and apparently hopeless.

"With the beginning of the fourth year the psychoanalytic method was undertaken. The main principle

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(1) N. Y. Med. Jour., Apr. 8, 1911.

was explained to the patient. She was told that the cause of her morbid symptoms was based upon some repressed ideas, that the repression was done by her for the reason of their unpleasant, unbearable, or painful character, that if they were brought to the surface, the psychic activities of her conscious *ego* would meet them, interpret them, and finally assimilate them, so that they would totally disappear and never return. As a woman of intelligence, she acquiesced to the proposition and promised to assist in the therapeutic undertaking. Twice a week for a period of four months séances were held and a thorough search into the past reminiscences was made. Facts were brought out that rendered the patient uncomfortable a great many times, but with gentle persistence aided by her intelligence the tendency for concealing certain data was gradually overcome The method used was the "free association." Parting from the morbid manifestation she presented at the time the examination was undertaken, namely the obsession as to her mental failure, she was told to commence to relate all possible facts that had a direct or an indirect relation to it. The probing into the forgotten field of the *ego* must be a slow procedure at the beginning, but when a certain number of reminiscences is brought to the surface, the others appear with less difficulty.

"The present case proved to me the existence of an extraordinary logical connection between the isolated facts recalled and recited by the patient. She herself was astonished at the harmony between them. As they appeared one by one before her conscious *ego*, she discussed them and gradually dismissed them. At the end of each séance she felt, to use her own expression, "much relieved," but recovery was obtained only when the pathogenetic idea was reached. She recalled that ten years previously when she was only nine years old, her then married sister had a violent discussion with her husband after which they separated. The reason of the discussion she then learned was his attention to females of any age. On one occasion he came in the patient's bed where he spent an hour, and then she observed he went into the nurse girl's bed. As his conduct was finally noticed by the wife, the altercation and separation followed. A year later the couple became reconciled and since then no disturbance occurred in the family. However, during the year of separation the outraged wife was several times in a sanatorium suffering from a nervous breakdown. At that time the patient was very much impressed both by the conduct of her brother-in-law and her sister's illness. As the reconciliation took place a year later and for nine years the couple lived happily, the patient, now a young lady of nineteen, had totally forgotten the event. The analytic method gradually led up to the recollection of the occurrence. It was indeed remarkable that since it was brought to the surface, discussed, and thoroughly assimilated, the patient's condition rapidly improved and finally a complete recovery followed."

The author sums up his views regarding this method of treatment as follows: "The cathartic or psycho-analytic method is important not because one or another special element of the human *psyche* plays a pathogenetic part in the causation of psychoneurotic manifestations, but because of its principle based on daily observations. Its sole object is to overcome the psychic force of resistance, which exists in every person when attempts are made to reveal the unconscious thoughts and desires, which are the main causes of the morbid symptoms. The correctness of the latter can be ascertained by every unbiased thinker who is willing to investigate it without preconceived prejudice. Our armamentarium in neurological and psychiatric therapeutics is exceedingly meagre. That our former methods in treatment of psychoneuroses, *viz.*: suggestion, persuasion, etc., are frequently without avail, every one of us will concede. If psycho-analysis is capable even in a limited number of intractable cases to procure relief and recovery where the old procedures fail, it should be welcomed and adopted. Only those who have the opportunity to observe daily the sufferings and torture experienced by the psychoneurotic individuals during months and years, can appreciate how important becomes a method that promises relief and recovery. It is true that the method consumes a considerable amount of time and intellectual effort on the part of both physician and patient. It is true that it is not applicable to every case. Nevertheless the obtainable results are a sufficient compensation for any amount of intellectual effort."

MORBID FEAR.

The subject of morbid fear, "morbid anxiety," the "anxiety neurosis," has attracted much attention in recent years as shown by the fact that it was the special subject of discussion at the recent meetings of both the *Society of German Neurologists*[2] and the *American Psychopathological Association.*[3]

The last named society is a new one, especially devoted to psycho-analytic work along the lines laid down by Freud and Jung. Jones begins his paper as follows: "That the present subject is one of immense importance becomes evident from the following considerations. Including its indirect manifestations, morbid anxiety is the most frequent single symptom in psychopathology, and, I feel tempted to add, perhaps in all medicine; it has been called, and without gross exaggeration, the Alpha and Omega of practical psychiatry. Secondly, the intensity of distress it may give rise to is equalled by that of very few other forms of suffering. Thirdly, the study of the pathogenesis of it is qualified, as perhaps no other, to lead us towards a comprehension of those deeper biological problems concerning the relation of body to mind that underlie the questions of the derivation of mental disturbances in general. Lastly, it is a disorder that in a great many cases obstinately resists treatment unless this is based on a proper understanding of the pathology of it." Concerning pathology there is a decided difference of opinion. Jones concludes: "*Morbid anxiety means unsatisfied love,* or, more elab-

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(2) Papers by Oppenheim, Hoche, Hatschek and Aschaffenburg and discussion in Deutsche Zeitschr. f. Nervenheilk., Vol. 41, pp. 173-226.

(3) Papers by Ernest Jones, Boris Sidis, John E. Donley and Morton Prince, with discussion. Jour. of Abnormal Psychology, June-July, 1911.

orately expressed: Under certain circumstances sexual excitations arise that can not follow their natural course of leading to either physical gratification or conscious desire for such; being deflected from their aim they manifest themselves mentally as morbid anxiety, physically as the bodily accompaniments of this.

"Morbid anxiety is commonly described by Freudians as being derived from repressed sexuality. While this is clinically true, it is psychologically perhaps more accurate to describe it as a reaction against the repressed sexuality. Desire that can find no direct expression is 'introverted,' and the dread that arises is really the patient's dread of an outburst of his own buried desire (typified in the common fear of becoming insane, *i. e.* of losing control of one's self). In other words, morbid anxiety subserves the same biological function as normal fear in that it protects the organism against painful mental processes of which it is afraid. It has a further biological root in being an exaggeration of the normal feminine apprehension of sexuality, and is thus a form of masochism."

Psycho-Analysis of a Case of Morbid Anxiety. Jones' description of the following case well illustrates the methods and reasoning of the Freudian adherents and is here given in full:

"The patient was a lady, aged forty-six, who had been brought up amid well-to-do and refined surroundings. Her education had been fairly good, and her chief interest, apart from the usual social ones, lay in music, particularly in piano music. There was no history of nervous trouble in any other member of the family. She had married at the age of thirty-five, had borne two children, and had enjoyed a happy married life. Seven years later her husband died suddenly. She herself had had no illness or nervousness until the age of twenty-six, when an attack of influenza left her with chronic indigestion. When this was bad it was accompanied with some slight general nervousness, but neither seriously inconvenienced her until the onset of her present trouble. This occurred eight months after her husband's death, and took the form of a severe "breakdown" which confined her to bed for several months, and from which she had never recovered. In the past four years her condition had varied somewhat from time to time, but for two months previous to my seeing her she had again been confined to bed. Her symptoms were as follows: In the region of the stomach was a sensation of discomfort and distension, with some nausea and flatulence. Accompanying this, and largely situated there, was a feeling of extreme "nervousness" and agitation. Mentally there was great restless anxiety, with a sense of uncontrollable dread of some unknown impending terror. Physically the attack was characterized by violent trembling of the whole body, especially of the limbs, hurried breathing, excited and irregular heart's action, and profuse cold sweating. She suffered continuously to some extent from these symptoms, being never quite free of them, but they were much worse during the attacks, which lasted for several hours, and occurred daily in the early morning; on this account she could never sleep after about 2 a. m. No evidence of any organic gastric affection had ever been made out, though diligent search had been made (internal measurements of the stomach, analysis of the contents, etc.). Careful treatment, chiefly directed towards the stomach condition but also of a psychotherapeutic nature, had been carried on throughout her illness, but without any avail. Weir-Mitchell treatment, as is so often the case with such patients, only made her condition worse, and had to be given up after a six weeks' attempt.

"Such were the main facts elicited by an ordinary medical inquiry. No doubt the condition would, as a rule, have been interpreted as being due to a severe grief occurring to a patient who was subject to chronic "functional dyspepsia," a sequel of influenza. Oppenheim states that grief and mental shock are such satisfactory explanations of the etiology of anxiety states that it is not necessary to search for repressed sexual complexes. The presence and activity of such complexes, however, is not affected by ignoring them, whereas they can be robbed of their power for harm by introducing them into consciousness. In the present case the effect of so doing was that after a month's treatment the patient was sleeping regularly throughout the night, after another month she was once more able to take up with enjoyment the social duties she had had to neglect for the past four years, and after a third month the malady was at an end.

"The first important step in obtaining a sexual history was when the patient, under a display of shame and remorse as painful as I have ever witnessed, confessed that from the age of twelve up to the present time she had lived through an almost continuous struggle against masturbation; she had kept her guilty secret from her mother, her husband, and every doctor who had treated her. With a partly correct intuition she interpreted her anxiety symptoms as a dread against once more succumbing to the temptation, which had naturally been greater since the cessation of marital relations. In fact the "nervous breakdown," eight months after her husband's death, had been preceded the month before by a temporary relapse in this direction.

"Such intense shame and remorse is rarely seen as a reaction against ordinary masturbation beginning at the age of puberty; as a rule it has deeper sources, being formed as a reaction against infantile auto-erotic tendencies, which have been repressed into the unconscious, and to which the later habit has become unconsciously associated. Liberation of these unconscious complexes causes the reaction to assume more normal proportions, and this is followed by a diminution in the force of the remaining temptation; these fortunate results followed the usual rule in the present case. The memories of the earlier auto-erotic activities were brought to consciousness by means of psycho-analysis, mainly of dreams. They concerned both phantasies and onanistic acts relating to the urethra and the two alimentary orifices, with the corresponding excretions. Bedwetting, continued almost nightly up to the age of thirteen, had acquired the significance of a nocturnal pollution, as it indeed frequently does. It had caused her great embarrassment and shame, for it so happened that it affected her social life in a considerable measure. On account of it she was not allowed to drink anything after 3 p. m., a restriction she evaded by guiltily stealing forbidden drinks; as a radiation of the corresponding effect she acquired a fondness for glycerine, vinegar, and whiskey. When she was three and a half years of age a baby sister was born, and her imagination, excited by the event, subsequently elaborated the following explanation of it: Children grew inside the body, and were evidently formed out of food; they entered the world through the only possible orifice, the anus. The food was stimulated to this activity through admixture with some fluid (analogy of urine and feces, later, watering and manuring of vegetation). This fluid was supplied by the doctor, was therefore some special kind of medicine that had to be swallowed. She acquired a "fascination" for medicines, and throughout her childhood days drank all she could obtain. In later years she had a pronounced loathing for medicinal fluids that had features at all resembling semen, for instance, buttermilk, flaxseed emulsion, and koumiss, all of which were forced on her with the aim of bettering the stomach condition.

"As she grew older and buried all memory of these tendencies by repression they manifested themselves in partly sublimated and partly reactive activities; for instance, the habits of finger-sucking and nail-biting (both of which were preserved through adult years), of biting and eating slate pencils, revelling in the making of sand pies, of mixing earth and water in a pot to make flowers grow (which was followed later by a passionate delight in flowers and in gardening), of manufacturing cold cream, cakes of soap, etc., and later in a fastidious abhorrence of dirt or untidiness in any form. She managed to prevent the creation of any neurosis, as a compromise formation on the part of the complexes, until she was twenty-six, when she had the attack of influenza. At this time she was severely disappointed in a love affair on which she had built many hopes; simultaneously it was decided, on account of bad wrist trouble, that she must forever give up the practice of piano playing. The latter had served as an outlet for much of her emotional life, partly through the esthetic pleasure of music, partly because, as is often the case, it was unconsciously associated with the act of masturbation, and was serving as a sublimated vent for this tendency. Her adult emotional (psychosexual) outlets and aspirations being thus violently checked, she was thrown back on the infantile forms, on the basis of which was constructed the neurosis. The first symptom of this was distressing nausea occasioned by the medical administration of whiskey, which was in many ways—one was mentioned above—associated with the infantile complexes. The various gastric symptoms, nausea, distension, flatulency, pain, etc., were individually psychically constellated, and were products of the infantile forms of her sexual life. Her heterosexual tendencies became fully awakened in marriage, and the renouncement of them was followed by a still more stormy return to old conflicts, with the outburst of the graver stage of the neurosis.''

Oppenheim's Views on Morbid Anxiety are very different, and he takes particular pains to point out his total disagreement with the Freudian views. His rather severe denunciation has already been quoted in this volume. He only agrees in the point of the great frequency, severity and obstinancy of morbid anxiety. Thus he had been consulted by 180 such sufferers during the preceding year. He made special efforts to learn the etiology and declares that emotional shock, such as Russian massacres and persecution, plays a more important rôle than sexual factors.

Characteristics of morbid anxiety are the association of the psychic phenomena, anxiety, with certain bodily phenomena, such as palpitation, sensation of the heart standing still, dyspnea, a feeling of paralysis, trembling, sweats, coldness of hands and feet, gastric discomfort, desire to urinate or defecate, etc. The psychic phenomena, however, are the primary ones. The morbid features are twofold, first, the excessive psychophysical reaction, secondly, occurrence of fear under conditions which would not affect a healthy person. The latter feature is the more important one. The patient usually fully realizes the groundlessness of his fear, and there is no lack of intelligence or judgment.

Oppenheim is convinced that morbid fear may have a physical cause, dependent on unusual reactions on the part of the vasomotor, visceral and secretory nervous mechanism in response to ideas or sensory impressions. As proofs of this he mentions: 1. The existence of a purely physically produced fear in severe stenocardial attacks. 2. Many victims of morbid fear give evidence of instability in the vasomotor or visceral nervous apparatus, shown by a tendency to tachycardia, arrhythmia, pseudo-angina pectoris, local syncope, hyperidrosis, polyuria, glycosuria, congestions, diarrhea, urticaria, angio-neurotic edema, erythema, etc.

The conditions may last for years or throughout a life time, though often with long intermissions, but complete recovery is occasionally seen, often as the result of treatment which consists chiefly in psychotherapy. First of all the patient must be assured that he is in no danger of becoming insane and that perfect recovery is possible even when the condition has lasted for many years. While in rare instances one interview suffices to bring about a cure, it is as a rule necessary to continue the psychotherapeutic treatment for several months. Some patients need constant guidance and others must have the psychic treatment every year. Oppenheim generally proceeds as follows: The patient lies on a sofa and is told to shut his eyes and relax. He places the hand on the patient's forehead and says: "Your suffering will now gradually become milder. The morbid ideas will return for a time but the fear will grow less and less. When it comes, the recollection of my statements will come vividly to your mind and more and more replace the fear until you are entirely rid of it. You should occupy your mind much with these promises and bear in mind constantly that complete recovery will be the outcome," etc. Such assurances are repeated frequently and made with particular confidence and positiveness after each relapse. Later the patient is told to place himself in situations in which the fear is likely to appear in order to practice self-control. He very rarely resorts to hypnotism.

HYSTERIA.

Theories of Hysteria. S. A. K. Wilson[4] contributes a very entertaining article entitled "Some modern French conceptions of Hysteria." The way in which the variable and multitudinous symptoms and freaks of hysteria apparently furnish proofs in support of almost any kind of theory is thus well expressed: "To the individual who is not so absorbed in science as to lose his sense of humor it may seem that Hysteria, the while she responds so nobly to the appeals of the advocates of these various theories, is quietly smiling in her sleeve. As of old the ascetic and the epicurean, the celibate and the polygamist, the socialist and the monarch by divine right, turned alike to the pages of Holy Writ for support of their particular ways of living and views of life and found it therein, so the exponents of the sexual theory, the suggestion theory, the sleep theory and the "hysteria-only-a-symptom" theory alike appeal to experience for confirmation of their opinion, *and find it.*"

Wilson rightly emphasizes the rôle of what might be called the subjective element on the part of the physician. "It is not merely that his hypothesis is apt to color the physician's way of looking at a case, but also that in some obscure and little-understood manner, the patients come in a sense to respond to his hypothesis, so that the wider his experience, the greater is the apparent confirmation of its truth. How else can we explain the fact so familiar to the student of the history of the disease? The clinics of Paris and Vienna have shown us how hysteria can be cultivated; the hysterical patients of the Salpêtrière differ from their fellows of the Pitié." [Charcot and his successor Raymond worked at the former, Babinski at the latter.—Ed.]. Wilson comments on the scant attention which has been given

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(4) Brain, 1911, p. 293.

hysteria in England, as English neurologists have been almost wholly occupied with organic diseases. Thus, of about 350 articles in the last 10 volumes of *Brain*, at most 10 relate to functional disease of the nervous system.

Babinski's conception is first taken up in detail. His now almost classical definition in its latest version is couched in the following terms: "*Hysteria is a special psychic state capable of giving rise to certain disturbances with characters of their own. It manifests itself principally by primary symptoms and by secondary or accessory symptoms. The former can be reproduced by suggestion with rigorous exactness in certain subjects and can be made to disappear under the sole influence of persuasion. The secondary symptoms are strictly subordinated to the primary ones.*

Babinski has attempted to revise the symptomatology of hysteria and to purge it of a great many features which have been wrongfully included, as they can not possibly be produced by suggestion. Among such symptoms are skin lesions, as ulcers, gangrene, pemphigus, hematemesis, hematuria and albuminuria. The greatest service he has rendered to the study of the subject is his demonstration of the frequency with which the so-called stigmata of hysteria have turned out to be the fruit of unconscious suggestion. Thus in 100 cases carefully examined by him no trace of anesthesia was discoverable, and he failed to detect narrowing of the visual field, dyschromatopsia and ovarian tenderness. It has become generally admitted that the previously very frequent, in fact nearly constant, detection of anesthesias was due to unskillful methods of examination which suggested the existence of disturbed sensation to the patient. His views have also led to a greater recognition of the necessity of removing the hysterical patient from an unsuitable environment and of preventing imitation and contagion. However, Babinski's views in their entirety have not met with general approval. As Wilson says, hypersuggestibility is rather a symptom and effect than a cause and the question arises: What is this peculiar mental state which has augmentation of suggestibility for a symptom?

The second French scientist whose views on hysteria have attracted much attention is Janet. They are thus stated: "Hysteria is a disease of the mind and belongs to the large group of maladies occasioned by cerebral depression or exhaustion; its physical accompaniments are vague enough, consisting chiefly in a general diminution of nutrition. It is characteristized principally by mental symptoms, of which the most important is impairment of the faculty of psychologic synthesis, an aboulia or constriction of the fluid of consciousness, manifesting itself after a special fashion; a certain number of elementary phenomena of motion—sensations and images—cease to be perceived and appear to be excluded from full conscious personal perception; hence there is a tendency to a permanent and complete division of personality, and to the formation of several independent groups. These psychologic systems either alternate or coexist. Finally, the defect of synthesis favors the development of certain parasitic ideas which evolve by themselves and in their entirety under cover of the contact of personal consciousness, and which manifest themselves in markedly variable disturbances, in appearance solely objective."

Janet's latest definition of hysteria is: *"Hysteria is a form of mental depression characterized by the retraction of the field of personal consciousness, and a tendency to the dissociation and emancipation of the systems of ideas and functions that constitute personality."*

Of the characteristics of the hysterical mind, according to Janet, some are common to it and other mental disturbances. Hysterical patients are neuropaths. They reveal a curious combination of emotionality and apathy; they are both sensitive and indifferent. They love to attract attention to themselves but often show little aptitude for attention. They often have what Janet calls "feelings of incompleteness." They are perpetually tormented by a vague *ennui* which they cannot overcome. Lack of will power is a common feature of hysteria as well as of psychasthenia. Of the characteristics which appear to be proper to hysteria there is (1) suggestibility. Janet lays much stress on this but, unlike Babinski, he considers it dependent on another factor; in other words, it is the result and not the cause of hysteria. (2) Absent-mindedness. There is a suppression of all that is not looked at directly. This is considered the common factor which may be traced in all hysterical manifestations. In the hysterical attack under the stress of some emotional shock the patient falls into a half faint, loses touch with the surroundings; his voluntary activity comes to a standstill. He is in a state which Janet calls "monoideic somnambulism." This is the psychic state, consisting in the detachment of a small system of interrelated ideas from the infinitely greater complex of ideas whose coherence constitutes the individual's personality or entire consciousness. This system of ideas set free and developing on its own account in the absence of inhibition becomes for the time being dominant. With the return of normal consciousness not only is this disaggregated or dissociated system forgotten but in the majority of cases the idea which awakened it into activity is also forgotten. (3) Another characteristic is the tendency to transfers and equivalents expressed clinically by a great variability in symptomatology. The essential idea in Janet's conception of hysteria is the "retraction of the field of personal consciousness." But while it is so retracted it is not to be imagined that all impressions not reaching it and made a part of its content are lost. On the contrary, they reach and produce their due effect in a secondary or subsidiary consciousness, the so-called subconscious mind.

Wilson believes that as far as they go, Janet's interesting and attractive opinions are the most satisfying of the various psychologic explanations of the disease that have been proposed. They serve better than any others to bring into relief the essential nature of hysterical disorders. Whatever alterations in our ways of regarding the neurosis subsequent investigation may effect, it can not be considered otherwise than as a disease of the highest or psychic level.

The Definition of Hysteria is the title of a paper read by Dubois,[5] the well-known Swiss authority on psychotherapy. He begins with the statement that hysteria was formerly considered a well-characterized disease, a clinical unit, but now investigation is directed toward the mentality of the patients, and efforts are made to detect the mental shortcomings on the basis of which trivial psychic or somatic causes may bring forth the hysterical symptoms. Since Charcot's days, suggestibility has been considered one of the chief distinctive features of hysteria, and it is the keynote of Babinski's definition. At first the work of the Nancy school on hypnotism seemed to confirm this as it showed how suggestion during hypnosis or the waking state may make numerous functional symptoms appear or disappear, but it was also shown that this suggestibility was not at all peculiar to hysteria since over 90 per cent. of so-called normal people react in the same manner to a more or less marked degree. Suggestibility is also met with in patients afflicted with neurasthenia, imperative ideas, hypochondriasis, melancholia and even paranoia. The same objections hold against the view that increased impressionability or emotivity is the main feature. The tendency to impulsiveness, to automatism, to weakened mental synthesis and to egocentricity has also been dwelt upon, but these tendencies also exist in most psychopathic persons and in many people without distinct morbid symptoms. It is, however, true that all of them are present in hysteria. Thus the weakness of the mental synthesis tends to increase the affectivity as it constantly nourishes it. Most hysterical attacks follow emotions, and they may be produced by suggestion and stopped by persuasion.

But all these features and the resulting functional somatic disturbances do not explain the most important characteristic of hysteria, namely, the persistence for weeks, months, years, or a lifetime of a multitude of functional disturbances which appear in the absence of

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(5) Correspondenzbl. f. Schweiz. Aerzte, July 1, 1911.

any primary material lesion and consequently must be ascribed to psychic causes. The author does not accept the explanation of the Freudian school, that these symptoms represent the reaction of the mind to hidden or repressed emotions. He says that there is no evidence either in physiology or in psychology that a stimulus which does not produce a sufficient direct reaction has a tendency to divert to other channels like a stream of water meeting with an obstacle. And if this repression of emotions really should have such disastrous consequences, he does not understand why it should occur only in hysterics, because we all have repressed emotions. There is altogether too much tendency to regard hysterical manifestations as abnormal reactions. Somatic symptoms of psychogenic origin are not specific for hysteria. In fact most of them may appear in a transient way in normal people. What is peculiar to hysteria is the persistence or *fixation* of numerous somatic disturbances caused by previous emotions. In a normal person an emotion may cause a sensation that the legs are giving way, but it is merely transient; in the hysteric it leads to falling down and to hysterical paralysis. In the normal person, the emotion and the physiologic disturbance dependent on it disappear together; in the hysteric also the emotional excitement vanishes but it leaves behind more or less persistent residual somatic reactions. It is erroneous to say that the symptoms appear spontaneously. The hysterical manifestations always occur in connection with a new emotion, whether analogous to the primary one or not. Thus, a patient who gets her first attack after a sexual trauma may get another one as a result of anger.

What is the cause of this fixation and exaggeration of the consequences of an emotion in the hysteric? The author ascribes this to a psychic peculiarity. Hysterical individuals are not only endowed with a vivid imagination as shown by their tendency to mythomania; they are not only sentimental and romantic, but they are also decidedly sensuous. Sexual feelings play a very strong rôle. In hysterical attacks one frequently can recognize expressions of voluptuousness or of shame and prudery which equally well disclose the preoccupation of the patient's mind. The sensuality consists mainly in a marked tendency to live in the impressions, to give them a free hand in the consciousness. For this reason the hysteric believes in all her impressions. She places the stamp of reality on them as soon as they appear. She almost takes pleasure in exaggerating them, and through the attention which she gives to them she retains them so vividly that she is apt to lose sight of the event which created the emotion.

Many other psychopaths, such as neurasthenics, concentrate this attention on their troubles and magnify them by the fear in which they hold them. The hysterics, as a rule, are devoid of this fear. Their suffering even seems to please them in the same way the poet may enjoy his mental anguish. This hysterical temperament, based on imagination and sensuality, is often found in poets, artists and musicians, who often cultivate this specific sensuality to the advantage of their art.

The history of hysteria is full of examples of fixation of attention on the somatic symptoms produced by the emotion, while the cause of the original emotion may be lost sight of. Thus a girl who had been the victim of attempted rape in her childhood may have forgotten how she protected herself, and her whole attention is given to a remaining contracture of the lower extremities. Another patient will no longer remember the event which first brought on nausea and vomiting that have lasted for months, and now believes she is suffering from an independent gastric affection.

The following definition is arrived at: *As hysterical we designate a multitude of functional disturbances which arise under the influence of real or suggested emotions, and which persist or are renewed even when the causative factors are no longer present. This characteristic fixation of post-emotional somatic disturbances is brought about by the tendency to place the stamp of reality on sensations which are the result of emotions, this tendency arising from sensuality or sensual impressionability.*

It is thus seen that hysteria is intimately connected with the peculiarities of character, and with the mentality of the patient. The events occurring in his life only play the rôle of exciting causes, and it is not sufficient to remove exciting causes or to remove any existing symptoms by suggestion or persuasion. A rational psychotherapeutic treatment is required which aims to combat the mental shortcomings, the suggestibility, the egocentricity and above all, the sensual impressionability which is a good quality only when strictly under the control of reason.

A Case of Hysteric Hemiplegia Immediately Following a Dream and Due to Auto-suggestion Arising from Numbness of the Arm Caused by Pressure is reported by Charles W. Burr[6] who prefaces the report by this statement: "The case I report is an example of auto-suggestion arising from a cause within the patient herself, or at least I believe it to be such, my explanation being that the shock of a dream upset the emotional stability, such as it was, of a woman already hysteric by nature, and the occurrence of a numbness in the arm with the associated disability resulting from pressure during sleep produced the auto-suggestion of a hemiplegia. But little study has been made of the dreams of hysterics and still less of their influence on the waking life. It is very rare for an hysteric attack to begin immediately on awaking, but it is possible that more often than we think the horror of a remembered dream may influence the patient hours or even days after its occurrence."

After relating her previous history of nervous instability the occurrence of the attack in question is given: "Four days before I saw her professionally for the first time, and when she was in quite good health, she called to her husband not long after she had gone to sleep, saying that a moment before she had been awakened by feeling a strange man's hand on her face. Really no one had touched her but, as she realized when awake, she had dreamed it. When she became fully awake she discovered that she could not feel

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(6) Amer. Med., February, 1911.

her left hand. She did not know it existed except when she looked at it. (I think the explanation of this is that her arm was numb from having slept upon it though I have no evidence of this save her husband's statement, which, however, was very positive.) By the next morning the arm was not only numb but she had lost power in it completely, and there was numbness on the left side of the face and in the left leg. There was some but not complete loss of power in the left leg.

"Examination revealed a well-nourished woman about fifty years old. The heart was normal and there was no evidence of arterial sclerosis. The urine was normal. There was tactile anesthesia over the entire left side including the face and stopping abruptly at the middle line. Deep pressure anywhere on the left side sufficient to cause pain or at least discomfort in a normal person, she felt, but without pain and localized only vaguely. Notwithstanding the tactile anesthesia, stroking the left sole caused a very rapid extension of the great toe and withdrawal of the foot. The movement was not like that occurring in disease of the lateral tracts. The right plantar jerk and both knee-jerks were normal. She could move the left arm in all directions but with little force and quite awkwardly. In bed she moved the left leg well. In walking she dragged it and did not swing it out from the hip. There was no palsy of the face. There were no contractures of the arm or leg. The pupils were equal in size and reacted well to light and with accommodation. She was very hysterical in manner in the popular sense of the word. Mentally she was silly, not demented, but she behaved like a spoilt child. She was very talkative but her answers to questions were not responsive. She would start to answer a question properly but would soon wander off to talk of things trifling in reality but more interesting to her at the moment.

"Being sure that there was no organic trouble I reassured her that she would recover but told her that if she was not well in a few days it would be necessary for her to go to a hospital where I could give her certain very elaborate methods of treatment. In three days the palsy and anesthesia had passed away, and though of course her hysteric temperament remained unchanged she was mentally bright and rather acute. The palsy did not disappear suddenly but rapidly improved from day to day, almost from hour to hour. The anesthesia passed off within eighteen hours of my first visit, presumably suddenly; at all events the next morning after my examination she said, 'I can feel now,' and when tested answered correctly. She was no longer silly but sensible and quiet in manner and bearing. Both the illness and its cure were brought about by suggestion."

[The Freudians probably would not accept Burr's simple explanation but would insist that the strange man's hand on her face had some relation to a long repressed old sexual impression which they would have tried to unearth by studying her dreams for a long period, and by putting her through various association tests, etc.—Ed.]

Hypnotism.

Babinski's Views on Hypnotism are clearly set forth by Meige[7] who first calls attention to the two principal divergent views concerning its nature, namely that of the Charcot school and that of Bernheim and his followers, who constitute the Nancy school. To the former hypnotism is closely related to hysteria, a sort of induced neurosis. Charcot maintained that there are certain somatic signs of the hypnotic state, particularly the neuromuscular hyperexcitability and the cataleptic plasticity which can not be simulated and appear entirely independent of the subject's will. This school considered hypnotism a powerful remedy in functional diseases but a dangerous weapon in the hands of the criminal. To the Nancy school there is nothing pathologic about it, and nearly every person can be hypnotized though with variable facility. It does not cure disease but merely removes certain symptoms and when used with care it is entirely without danger.

Babinski, on the basis of careful clinical observation,

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(7) Revue Neurologique, Jan. 15, 1911.

including graphic tracings of muscular action, declares that the somatic signs described by Charcot have no diagnostic value, and that *the hypnotic state possesses no somatic signs which can not be voluntarily imitated.* He maintains that no person can be hypnotized against his will, and that the subject on awakening remembers everything that happened during the sleep. "After an hypnotic seance in which you suggest that the subject will forget everything on awakening, your subsequent questions may not provoke any response, and the mask of ignorance which the patient wears inclines you to believe in the success of your suggestion. But if you proceed in a roundabout way, like an able lawyer, you will easily get the patient to repeat sentences which prove that his memory was not interrupted. This is easier if you make your interrogation a few hours or days after the seance. *The subject is not unconscious during the so-called lethargic state.* He remembers the words spoken and one may enter into communication with him in various ways although he is apparently in a deep sleep. Thus one may say 'I raise your arm ten times; the tenth time the arm, which has been relaxed, becomes stiff.' This usually succeeds. Hence the subject has heard the words, watched the manipulations attentively and he has obeyed."

Does the subject lose all voluntary control in the somnambulistic state and is he compelled to do, during the hypnosis or afterward, what has been suggested to him? No, because his will is only apparently in abeyance. One may make him do nonsensical acts such as opening an umbrella on suggesting that it rains although the sky is clear, caress an imaginary dog or rock an imaginary baby, etc., trivial acts which will not injure him or anyone else, but one does not succeed in suggesting disagreeable or harmful actions. "The critical faculty is not lost in the hypnotic sleep. The subject does not become passive, and he makes his choice among the various suggestions offered. His will is so little impaired that he is able to guard secrets, even unimportant ones which one attempts to have him disclose."

According to Babinski hypnotism is closely related to hysteria and has appearances which are the products of simulation. "Hypnotizable and hysterical subjects are susceptible to symptoms (hypnotic phenomena, hysterical phenomena) in the reality of which they believe but only to a certain extent; their sincerity has its limits. Under all circumstances the hysteric behaves as if he were in part master of his disease and as if his sincerity were not absolute. In contradistinction to the epileptic he has his attacks only in certain situations. He issues uninjured from acrobatic feats which frighten the audience; apparently the prey of terrifying hallucinations, he does not, like the hallucinated alcoholic, commit dangerous acts; the apparent victim of complete loss of pain sense, he does not suffer any burns like the syringomyelic patient; no matter how marked the apparent narrowing of his visual fields, he has no difficulty in avoiding obstacles, as has the patient with organic narrowing. *The phenomena of hypnotism, like those of hysteria, are the results of suggestion and disappear under the influence of a counter-suggestion, persuasion.* One easily conceives how hypnotism, being a product of imagination, of suggestion, presents diverse aspects. The hypnotic sleep does not create suggestibility. It has not even been shown to increase it; it is merely a manifestation of suggestibility.

The therapeutic uses of hypnotism, if one accepts Babinski's views, are very limited. He says "If hypnotism neither creates nor increases suggestibility, it would appear to have no object. However, it is true that many hysterics have been cured after being hypnotized. But the cure was not the result of hypnotism; it resulted because the patients were susceptible to suggestions. Psychotherapeutic means in the waking state would have cured them equally well. Hypnotism in general is not only useless but attempts at inducing hypnotic sleep, when unsuccessful, only have deplorable results, because the patient loses confidence in the physician. Exceptionally a case presents itself in which the use of hypnotism is justifiable, namely, when a patient, after the failure of many methods of treatment, has become a victim to the suggestion that he can be cured only by hypnotism."

Medico-legal Aspects. Babinski discourages the theory that a person may commit crimes suggested in the hypnotic state which he could not be induced to commit under other circumstances. To the question of sexual assaults on a hypnotized woman he replies categorically: "A woman who gives herself to a man during or after the hypnotic state would do the same without being hypnotized. Hypnotism has not paralyzed her will nor given the hypnotist the power to violate her."

TRAUMATIC NEUROSIS.

The Frequency of Traumatic Neurosis is the subject of an article by H. Stursberg[8] who states that in spite of the extensive literature on this condition very little work has been done to determine its actual frequency, a question of great practical importance in connection with recent and pending legislation on employers' liability and workers' insurance. He has found only two papers dealing systematically with the question of frequency. One by Biss concerns sailors and railway employees. Of 9,000 reported accidents among the former there were 24 cases of nervous disturbances which might be considered functional. However, as there were included cases following sunstroke, gas poisoning and work in compressed air it seems probable that some of them were organic. Of 21,000 accidents in the railway men 1,600 occurred in men entitled to compensation, and 7 of these showed functional disturbance after relatively slight injuries. Merzbacher studied the statistics of a German steel corporation and concluded that the frequency of traumatic neurosis is much less than is generally supposed. Among 8,500 accidents 1,370 occurred under circumstances entitling the worker to compensation and among these there were only 13 cases of neurosis although he uses this term in a very wide sense.

Stursberg's material consisted of workers in the building trade of Westphalia. From 1886 to 1906, 14,259

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(8) Neurol. Centralbl., Aug. 16, 1911.

accidents were reported. Among these there were 24 cases of functional nervous disturbance. In 4 of these there was also organic nervous disease and in 4 others there were indications of mental disease. It is noteworthy that only 2 cases were noted in the first 10-year period and 22 in the second 10-year period. All of the 24 patients were still receiving compensation in 1906, showing that none had recovered. 1,241 men were receiving compensation in 1906, giving a percentage of only 1.9 for the cases of traumatic neurosis. This low figure agrees perfectly with those obtained by the two others mentioned.

Stursberg believes that there is a tendency among neurologists to overestimate greatly the frequency of this affection. They naturally see the cases with nervous affections but lose sight of the enormous number of injury cases which are not sent to the neurologist. As the affection lasts for years, the patients are apt to pass through the hands of a great many observers, thus causing a great duplication in the case records of neurologic clinics.

Judging from the proceedings of the last meeting of the *American Neurological Association* [9] there is a tendency in this country also to form an exaggerated idea of the frequency of traumatic neurosis, and to use this as an argument against otherwise beneficial and just liability legislation. Some of the speakers seemed to consider it true philanthropy to warn legislators about the danger of such legislation.

EPILEPSY.

Epilepsy and Other Forms of Convulsions in Their Relationship to Diseases of the Digestive Tract. W. Ebstein [2] prefers not to use the ambiguous term "epileptiform attacks" and, following Jolly, employs the term "eclampsia" in connection with single convulsive attacks or a group of attacks occurring within a limited period. He emphasizes that eclampsia used

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(9) Jour. Nerv. and Ment. Disease, 1911, p. 546.
(2) Deutsche Arch. f. klin. Med., August, 1911.

in this sense does not signify an independent disease, but merely a symptom group due to acute irritation of the brain in connection with various morbid processes or the result of intoxication. He first discusses convulsions occurring during dentition, and agrees with Nothnagel that convulsions in connection with teething as well as other affections of the digestive tract from the mouth to the anus are to be ascribed to irritation of sensory nerves. However, it is probable that in such cases we are dealing with an inherited disposition, otherwise the attacks would be much more frequent as such children are generally prone to react to various forms of irritation by convulsions. Furthermore, Uppenheimer, on the basis of a thorough study of several thousand teething infants, finds that the convulsions and other so-called teething diseases do not depend on the process of dentition, but are the expression of autochthonous diseases that merely appear at this time on account of the lowered resistance of the child. It is also probable that convulsions occurring in children who have intestinal worms indicate the existence of a predisposition. Nothnagel found that such children had been perfectly well until the convulsions appeared, and that generally the presence of worms had not been known. Without assuming a special predisposition it would also be difficult to understand why such a small percentage of worm-infected children get convulsions.

As to the convulsions occurring in children suffering from gastro-enteritis, they have been attributed to coexisting nephritis and looked upon as uremic convulsions, while others have assumed the existence of hydrocephalus, edema of the meninges and brain substance, or an encephalitis. Jolly as well as Redlich looks upon convulsions in gastro-intestinal catarrh and in chronic constipation and disease of the genital organs as an expression of the predisposition previously mentioned. The author, who ten years ago wrote a book on chronic constipation, has followed up the fate of a large number of constipated children affected with convulsions, some with and some without genuine epilepsy, and in many cases he found that cure of the constipation had led to an entire disappearance or a great reduction of the number of attacks. He is not familiar with any case of permanent cure of epilepsy following the relief of constipation in adults but marked improvement often occurs.

[This paper, like many others on the same subject, only shows that we are merely aware of the occasional coincidence of convulsions and disturbances in the gastro-intestinal tract. No light whatever is shed on the problem as to which is cause and which is effect. Assertions are made which can be neither proved nor disproved. The same is true in a general way of what is constantly being written about auto-intoxication as the cause of nervous and mental disease.—Ed.]

The Pupillary Reaction During Epileptic Attacks was studied by Buchbinder[3] whose material consisted of 1,100 soldiers who had been discharged from the army on account of epilepsy. Those who were also alcoholics or hysterics were not included. The eyes were examined in several thousand attacks. In the first stage of the attack it was observed that the patient, while unconscious and in a state of tonic rigidity, had very narrow pupils which at the moment of relaxation of the tonic spasm dilated widely without reacting to light. Then, after a couple of seconds, they became of medium size and reacted. During the clonic convulsions in 34 typical severe attacks in 28 patients the pupillary light reaction was preserved. During atypical or slight attacks the pupils of 4 patients were wide, and in 4 patients reacted promptly to light; in 4 patients they reacted sluggishly and in one patient scarcely at all.

Paradoxical reaction during the clonic convulsions was observed in 3 cases, and at the end of the convulsions before the return of consciousness, in 3 cases. Rapidly changing size of the pupils independent of light stimulation was observed in 2 patients with typical attacks. At the end of the attack, *i. e.*, during or after the last spasms, the pupils assumed normal size and reaction even when unconsciousness continued. Only rarely did

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(3) Med. Klin., 1910, No. 21.

the pupils remain rigid after the convulsions had ceased. Inequality of the pupils occasionally remained for several days, and after certain attacks it was combined with unequal promptness of the light reaction. In 2 instances the consensual reaction was sluggish.

Lumbar Puncture; Its Theoretic and Practical Results in Epilepsy. Redlich, Pötzl and Hess[5] studied the cerebrospinal fluid of epileptics. They found that the behavior of this fluid in regard to substances introduced from without or formed in the body showed no material difference in epileptics from that found in other persons. In both classes some of these substances, particularly bromids and acetone, appeared in the fluid. It is possible that certain injurious substances which precipitate the attacks may appear in the fluid, and they probably appear more readily when, like acetone, they dissolve lipoids, or when, like bromids, they are capable of substituting a normal constituent of the body fluids; or when the epithelium of the choroid plexus has been injured. In cases where positive results are obtained in testing the toxic effect of the cerebrospinal fluid of epileptics it must be borne in mind that it is possible for injurious products of excretion from the nervous system to appear in the fluid as a result of the attacks.

The pressure of the cerebrospinal fluid was measured in 39 cases of various intensity. There were cases in which the pressure was constantly moderately, but not greatly, increased and in the latter instance the authors would have expected paralysis rather than irritation. In many epileptics the pressure was above normal at the time of the attacks. In patients suffering from postepileptic psychoses the pressure was repeatedly found to be below normal. With a view to treatment, the possibility of a beneficial effect from repeated lumbar punctures or from draining the spinal subdural space is considered.

Lumbar Puncture in Status Epilepticus is recommended by P. Castin[6] who had good results in 4 cases.

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(5) Zeitschr. f. d. ges. Neur. u. Psych., Vols. 2 and 3.
(6) L'Encéphale, 1910, No. 8.

One or two punctures may be made but not more than 15 or 20 c. c. should be removed on each occasion. Schiffer[7] also recommends lumbar puncture in the treatment of epilepsy in children, including the symptomatic form in birth palsies.

Death in Status Epilepticus. Briand[8] has examined several cases post-mortem. In one there was congestion at the floor of the 4th ventricle the arterioles of which were thrombosed with the appearance of ecchymoses in the neighboring ependyma. Such thrombosis alone would account for death, and the author has made the same observation in paretic dementia. Other causes of death in epileptic attacks were fracture of the skull, poisoning from the accumulation of carbon dioxid [in other words asphyxia], drowning in a bath-tub, etc.

L. Marchand[9] has found 13 reported cases with necropsy in which death occurred during an epileptic fit. In 7 cases the direct cause of death was outside the brain: Choking from aspiration of food into the respiratory tract in 2 cases, rupture of the heart in 3 cases, rupture of the aorta in 2 cases. In the group of 6 cases with a brain lesion as the cause of death congestion of the brain alone existed in 2, and subpial, ventricular, meningeal, and bulbar hemorrhage in one each.

The author adds 2 cases. A man of 26 years of age had only the one attack on the day of his death. Necropsy revealed congestion of the meninges, and microscopically there also was pial and subpial suffusion of blood. The second patient, a man of 25 years of age, had three attacks at intervals of several hours on the last day. He died during the tonic stage. There was congestion of the meninges, especially in the frontal lobes; the pia was adherent; and the floor of 4th ventricle was greatly congested. Histologically there was found great dilatation of the vessels of the medulla oblongata, and extravasation of blood in the floor of the 4th

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(7) Klin.-therap. Wochenschr., 1910, No. 20.
(8) Jour. de Méd. de Paris, 1910, No. 35.
(9) Gazette des Hôp., 1911, No. 1.

ventricle, especially in the nuclei of the hypoglossus and pneumogastric nerves. There was no disease of the vessel walls in either case.

Surgical Treatment of Idiopathic Epilepsy. Among epileptics in a Hungarian institution Zimmermann[2] observed 5 cases of so-called focalized epilepsy, *i. e.*, the attacks always commenced in the same extremity and then spread to the rest of the body. Four of those patients were operated upon. An osteoplastic flap was made over the opposite motor area, and in 3 cases the cortical center corresponding to the limb in which the convulsions commenced was determined by the application of the faradic current, and excised. After the operation there was a transient paralysis of the affected limb. In 2 cases massage of the cortex by Bircher's method was practiced. This was followed by partial paralysis lasting one or two days. In each case considerable bone was removed from the flap. In 3 of the focalized cases the convulsions stopped, while the fourth patient had 3 light attacks nine months after the operation and then no further attacks. Before the operation this patient had as many as 20 attacks a day, was extremely demented and had involuntary discharges. The latter ceased after the operation and both the general physical condition and the intelligence improved decidedly. One patient died of meningitis, the infection being caused by the patient tearing off his bandages; the wound had been left partly unsutured, because the longitudinal sinus had to be packed. Three cases of diffuse idiopathic epilepsy were operated on the right side. Afterwards there were no convulsions on the left side and the attacks were less frequent and less severe. One of these patients was subsequently operated on the left side and then the remaining right side convulsions stopped.

The author admits these reported "cures" can not be considered final, since three years have not passed since the operation, as demanded by Krause. The patients did not receive bromids after the operation.

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(2) Neurol. Centralbl., 1911, p. 569.

S. Weil,[3] on the basis of 21 cases operated at Küttner's clinic in Breslau, enumerates the following conditions as suitable for operation: 1. All cases of cortical epilepsy of traumatic origin. 2. Diffuse epilepsy of traumatic origin when the attacks at first are of cortical character. 3. Diffuse forms presumably caused by a bony scar in the skull. 4. Non-traumatic Jacksonian epilepsy. 5. Diffuse convulsions with paralyses or other pronounced focal symptoms, especially when the attacks at first are circumscribed. 6. When both the history and course point to an organic basis, when at the same time medical treatment has failed, when the attacks are severe and mental weakness begins to set in. In pure idiopathic epilepsy, on the other hand, he does not consider operation justifiable. The results of surgical treatment are not very satisfactory, though fairly so in the purely traumatic Jacksonian types. However, the attempt is justifiable, because good results occasionally are obtained when medical treatment has entirely failed.

MIGRAINE.

The Cerebrospinal Fluid in Migraine. Quincke[4] had opportunity to make lumbar puncture during attacks in 3 cases of migraine, in all of which there was moderate increase in pressure, but the increase was not sufficient to account for the headache. The author suggests the possibility of hyperemia of the meninges or edema of the dura. The pain seemed to be considerably relieved immediately after the puncture. In this connection Quincke remarks that there are all conceivable transitions between migraine and the headaches of chlorosis. In the latter the pressure of the cerebrospinal fluid is not usually increased, although this is sometimes the case during very severe paroxysmal headaches which often last several days. Slight increase of pressure has also been found in habitual headaches

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(3) Beitr. z. klin. Chir., Vol. 70.
(4) Deutsche Zeitschr. f. Nervenheilk., Vol. 40, p. 100.

of uncertain origin or in headaches apparently dependent on gastric disturbance, constipation or neurasthenia. He believes that in all of these conditions there is transient serous exudation, *i. e.*, fluctuations in the secretion of cerebrospinal fluid usually accompanied by variations in the fulness in the meningeal vessels (angioneurotic hydrocephalus).

CHOREA.

Pathology of Huntington's Chorea and of Choreic Movements in General. Alzheimer[5] says that there is no longer any doubt about the presence of severe degenerative changes in the cerebral cortex in Huntington's chorea. It is only uncertain whether there also is an arrest of development in the cortex. But that the cortical disease is the cause of the choreic movements is unlikely because we know many diseases with severe cortical disease where no choreic movements occur. On the other hand, there are also in Huntington's chorea severe changes elsewhere in the brain to which the movements more likely are attributable. In 3 cases examined the most severe changes were in the corpus striatum, involving both the caudate and lenticular nucleus. In the 2 most advanced cases there was here scarcely a nerve cell left which could be considered capable of functionating, and there was also enormous proliferation of glia cells without increase in fibers. There were large masses of lipoid substances of various kinds in the ganglion cells, glia cells, and cells of the vessel-walls. In the subthalamic region the cells also were much degenerated, less so in the thalamus, pons and medulla; and even in the cord there were slight degenerative cases. Hence we must look upon Huntington's chorea as being caused by a degenerative process in the cortex of the brain, corpus striatum, subthalamic region, and less so in other parts of the central nervous system.

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These changes, particularly in the corpus striatum and subthalamic region, were also present in 2 cases of chorea occurring in connection with sepsis and in 2

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(5) Neur. Centralbl., Aug. 1, 1911.

cases of "rheumatic" chorea. There were small foci of proliferated glia cells, often mixed with rod-shaped cells, especially in the vicinity of vessels, and in the septic cases heaps of cocci were found to occlude the vessels. In the rheumatic cases the foci were similar but no micro-organisms were demonstrable. It must therefore be considered probable that septic and rheumatic chorea depend on embolic foci which are most frequent in the corpus striatum and subthalamic region.

Salvarsan in Chorea Minor has been used with success by Bokay[6] who administered 0.2 gms. subcutaneously to a child of 8 years of age. Improvement commenced on the second day, was very striking on the fifth day and after four weeks recovery was complete. Another child with a less severe chorea treated with Fowler's solution made a much slower progress.

Two cases with recovery in 15 days after injection of 0.2 gms. are reported by Hainiss,[7] and Benno Hahn[8] reports 3 cases with intravenous injection of 0.08 to 0.3 gms. and recovery in from 8 to 28 days. Each of Hahn's patients received three injections, three to eighteen days apart. It is certainly unusual to get such rapid recovery with other modes of treatment, and salvarsan seems worthy of more extensive employment in chorea.

MENTAL TORTICOLLIS.

Mental Torticollis and Its Treatment. Sicard and Bloch[9] presented 2 cases to the *Paris Neurological Society,* illustrating the results of two very different modes of treatment. One was a man 70 years old with a "hyperkinetic diathesis," for he had also suffered from writer's cramp. The torticollis had existed for ten months and followed an operation for pterygium. He was treated by rest, isolation, and injections into the affected sternomastoid muscle of scopolamin hydrobromate in doses of about 1/200 of a grain once daily. Almost complete recovery resulted. The other patient,

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(6) Deutsche med. Wochenschr., Jan. 19, 1911.
(7) Orvosi Hetilap, 1911, No. 21.
(8) Deutsche med. Wochenschr., Aug. 24, 1911.
(9) Revue Neurologique, Nov. 30, 1910.

a woman of 46 years of age, had been afflicted for 8 months, also following an ocular affection, namely a severe conjunctivitis. She was also a neurotic person, irritable, and given to crying and lamenting. She had had the external branch of the spinal accessory nerve resected, but the condition only grew worse.

OTHER NEUROSES.

Vertigo Permanens. Oppenheim[2] reports 4 cases in which he made this diagnosis. The affection is a functional one, occurring only in neuropathic or psychopathic individuals, in whom without apparent cause or after excesses, overwork or excitement a typical attack of vertigo with nausea or vomiting occurs. Then follows the permanent vertigo which remains for years. The patient feels as if walking on water or on a rolling ship, or as if moved to-and-fro like a pendulum. Surrounding objects also seem to move. While continuous, the vertigo varies in intensity and is increased on walking or standing. From time to time also genuine vertiginous attacks occur, while in the interval there is no difficulty in maintaining the equilibrium. The patient always feels relief when riding on a train, in a motor car or a carriage. Sometimes the patient finds relief in making rocking movements with his body. Occasionally there are peculiar subjective sensations, for example, in one case that of a motor working along the left side of the spine. Objective examination is always negative. There is no sign of labyrinthine, cerebellar, ocular or gastro-intestinal disturbance. But ordinary neurasthenic symptoms are usually present, such as palpitation, poor sleep, flatulence, irritability, retinal oversensitiveness, etc.

Oppenheim is convinced that this form of vertigo is neither the expression of morbid fear, nor of hysteria. He believes it is a genuine vertigo, not produced psychically, nor by demonstrable organic changes, but depending on irritation of certain regions of the central nervous system, analogous to certain forms of perma-

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(2) Neurol. Centralbl., 1911, p. 290.

nent nervous headache. He places the irritation in the perceptive centers of the cerebrum, rather than in the cerebellum or vestibular nuclei. No other author has fully recognized the condition, although Löwenfeld has come close to it. The prognosis as to recovery is very poor but the condition is not dangerous to life. The treatment is very unsatisfactory. Suggestion is useless. Some relief has been obtained by bromids, and by the use of fairly large amounts of alcoholic beverages.

Fever in Vasomotor Neuroses. F. Egger,[3] after briefly discussing the question of the existence of so-called hysterical fever, reported the cases of 4 women whom he had under observation from 4½ to 7 years. They were not cases of vasomotor trophoneurosis but of psychoneurosis with prominent vasomotor disturbances, such as emotional blushing, erythrophobia, hyperemias, periodic swelling of the tissues of the face and upper extremities, local and general hyperidrosis and disturbances of cardiac innervation. None of the patients showed signs of hysteria or of exophthalmic goitre. In none was there any sign of any infectious disease, particularly tuberculosis. The latter had been excluded by every diagnostic means possible, including the tuberculin test. For years these 4 patients showed moderate evening temperature, from 99.5° to 101.3° F. There was a distinct relation to the menstrual periods, the greatest elevations being observed just before, and the least just after these periods. The patients were always made uncomfortable by the fever. There was no loss in weight.

Egger concludes that we should not only consider "hysterical fever," but also *febrile conditions in the psychoneuroses.* We are not yet clear about the origin of the fever. The stability of the body weight and the absence of all somatic, non-psychic symptoms makes the existence of toxic fever improbable. The possibility of a psychic origin can not be denied when we recall experiences with tuberculous patients in whom injections of indifferent fluids instead of the expected tuberculin caused decided rise in temperature. The author also

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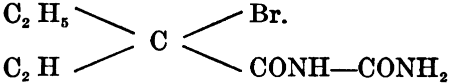
(3) Correspondenzbl. f. Schweiz. Aerzte., Apr. 1, 1911.

refers to the successful production of fever by suggestion accomplished by Debove. One would naturally, in patients with unstable vasomotor centers, also consider a possible psychic irritation of unstable heat centers. The relation to menstruation may be explained by the increased psychic irritability at the periods, but possibly also somatic influences, such as internal secretion, play a rôle. The author emphasizes the importance of recognizing the possibility of febrile conditions in pure psychoneuroses, otherwise tuberculosis or other infectious conditions may be wrongly assumed to exist to the detriment of the patient.

TREATMENT OF THE NEUROSES.

Organotherapy of Enuresis Nocturna. D. Konradi[4] treated 7 cases with thyroid tablets for months. In 3 cases a cure was obtained but the others showed no improvement until he changed to testicular extract in the form of "didymin" when considerable improvement followed. In all of the cases anemia was present, which the author considers an important factor in the causation of the enuresis.

A New Hypnotic. **Adalin** has received considerable favorable comment. Thus Kalischer[5] and A. Kempner[6] speak well of it. Chemically it is bromdiethylacetyl carbamid of structural formula



It is a white, crystalline, almost odorless substance, very sparingly soluble in water. It is put up by the Farbenfabriken of Elberfeld in the form of tablets. The sedative dose is 0.25 to 0.5 grains (4 to 7 grains). The hypnotic dose is 0.5 to 1.5 grams (7 to 22 grains). It was found to have no ill effect on the heart and kidneys. It does not relieve pain to any extent. It was found that after its use, the patients do not complain of pressure sensation, headache or a feeling of fatigue as is

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(4) Gyogyaszat, 1910. (In Hungarian.)
(5) Neurolog. Centralbl., 1911, p. 12.
(6) Ibid., p. 309.

the case after many other hypnotics, such as veronal and sulphonal. It is very rapidly eliminated and has no cumulative effect. Hence where a cumulative effect is desired, as in epilepsy, bromids are preferable. The bromid element in the remedy is a negligible factor. For insomnia Kempner gives 1 gram (15 grains) of the drug in hot water. His patients stated that the sleep produced was in no way different from natural sleep.

A number of other authors make similar statements. The remedy seems to be an excellent and harmless hypnotic in functional conditions, but does not appear to influence such conditions as chorea and tremors.

DISEASES OF THE BRAIN AND MENINGES.

EPIDEMIC MENINGITIS.

The Blood Picture of Epidemic Meningitis. Rusca,[7] working in Sahli's clinic in Bern, made differential leucocyte counts every few days in 9 cases, the results in each one being charted. The characteristic features are, first of all, early leucocytosis with relative increase of the polymorphonuclear cells. In case of recovery, there is later a decrease in the polymorphonuclear cells and a relative increase in the lymphocytes, while in fatal cases, the relative increase in the former persists. In the non-fatal cases, the eosinophiles remain normal or above normal, while in the fatal ones, both eosinophiles and mast cells disappear before death. Representing the average results in the two groups of cases graphically, the curves represented in Fig. 1 are obtained. It will be seen that in the non-fatal cases the neutrophile and lymphocyte curves ultimately cross, while in the fatal cases they continue to diverge until the end. These findings have an obvious prognostic importance, an increase in lymphocytes and eosinophiles pointing to recovery. However, the absence of crossing of the neutrophile and lymphocyte curves and the disappearance of eosinophiles do not preclude recovery. It is interesting that in 4 cases meningococci were detected in

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(7) Deutsche Arch. f. klin. Med., July, 1911.

the stained blood specimens, and in one of these positive blood-cultures were obtained.

Meningococcic Septicemia and Endocarditis. Cecil and Soper[8] state that meningococcic septicemia was first reported by Gwyn.[9] His case was due to epidemic meningitis complicated by acute arthritis, and the meningococcus was isolated from the spinal fluid, synovial fluid and the blood. Since then, similar cases

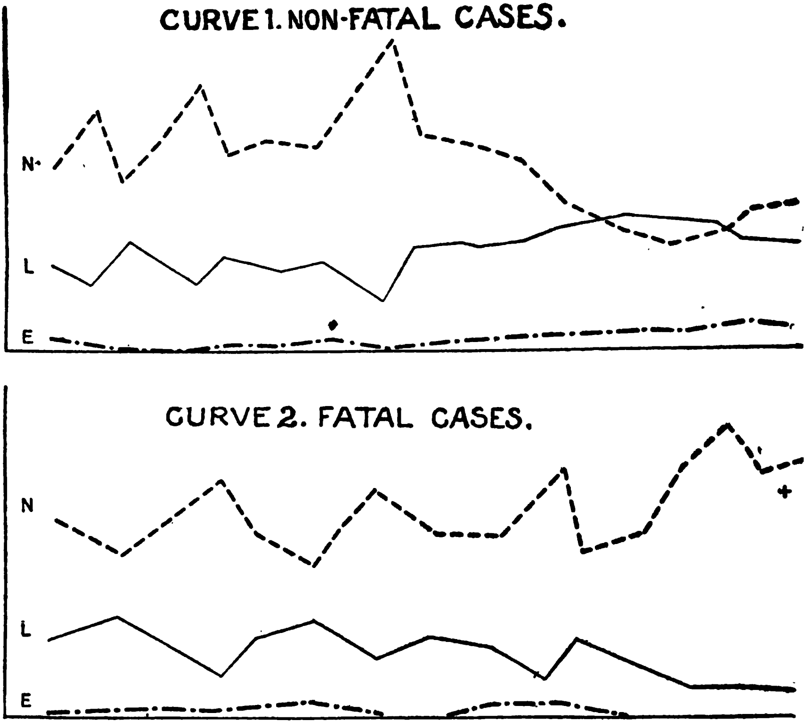

Fig. 1.

Blood curves in epidemic meningitis.
N. Neutrophiles (Polymorphonuclear cells).
L. Lymphocytes.
E. Eosinophiles.

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(8) Archives Int. Med., July, 1911.
(9) Johns Hopkins Hospital Bulletin, 1899, p. 112.

have been reported in considerable numbers. Thus Elser[1] found the meningococcus in the blood in 10 out of 41 cases of epidemic meningitis. In such cases there has generally been an associated inflammation of some cavity or cavities lined by endothelial cells, such as the joints, pleura, pericardium or endocardium.

Up to 1902 no case had been reported in which the meningococcic infection primarily lodged outside of the meninges, but in that year a case was reported from Germany by Salomon. A woman was ill for two months with chills, fever, joint-swellings, and an erythematous eruption before any signs of meningitis developed, and the meningococcus was obtained from the blood before the meningitis appeared. Finally, in 1906, cases commenced to be recorded of fatal meningococcic infection without any evidence of meningitis at the necropsy. The organism obtained in some of these cases has been agglutinated by a 1 to 300 dilution of antimeningococcic serum, and the patient's serum has agglutinated known meningococci. Rapid recovery has followed the use of the serum.

Cecil and Soper's case was that of a man 31 years old who was taken ill with a sore throat, fever and pain and tenderness in the right wrist and elbow, followed in two days by severe frontal headache. On admittance to the hospital two weeks later the tonsils were enlarged and congested, presystolic and systolic murmurs were heard at the apex, and a few joints were swollen. The clinical picture was that of rheumatic fever and endocarditis. The first blood culture was negative and the leucocyte count was 15,000. The temperature rose to 104.5° F. and the patient became delirious. A second blood culture made three days later yielded a meningococcus, but there were no symptoms of meningitis, and the cerebrospinal fluid was normal. In spite of several injections of serum the patient grew worse and died three weeks after the onset. The necropsy revealed an acute vegetative mitral endocarditis, acute enlargement of the spleen, infarcts in the spleen and right kidney and cloudy swelling of the

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(1) Jour. Med. Research, 1905, Vol. 14, p. 89.

viscera. There were also chronic changes in the heart and kidneys. There was no meningitis or encephalitis. Meningococci were stained in smears from the vegetations on the mitral valves.

A very similar case of meningococcic endocarditis of the mitral valves without meningitis and in which the meningococcus was obtained from the blood during life was reported by Warfield and Walker.[2]

After an interesting discussion of the probable entrance of infection and other problems in connection with meningitis, the following conclusions are formulated by Cecil and Soper:

1. The meningococcus, in spite of its affinity for the meninges, may at times become lodged on the endocardium with the production of an acute, vegetative endocarditis. In this respect it resembles most of the other pathogenic bacteria which, by showing a predilection for some particular organ or tissue, only occasionally produce serious lesions in other parts of the body.
2. The symptoms and pathologic anatomy of meningococcic endocarditis correspond with those which characterize malignant endocarditis of streptococcic or pneumococcic origin.
3. Meningococcic endocarditis may, or may not, be associated with cerebrospinal meningitis.
4. The portal of entry for meningococcic endocarditis is probably the upper respiratory tract. It is particularly interesting to note that the avenue of infection is the same as that generally accepted as the portal of entry for streptococcic endocarditis on the one hand and for meningococcic meningitis on the other.
5. The occurrence of primary meningococcic endocarditis with meningococcic septicemia furnishes evidence in favor of a hematogenous mode of infection in epidemic cerebrospinal meningitis.

"Serum Meningitis" and Anaphylaxis Following Injections of Antimeningitic Serum. In order to test the efficacy of artificial fever in the treatment of mental diseases along the lines practiced by Donath and others

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(2) Bull. Ayer Clin. Lab., 1903-06, p. 81.

who injected sodium nucleinate subcutaneously, Sicard[3] went a step further in order to produce reaction in the coverings of the central nervous system. As he obtained surprisingly severe reaction on the injection of only 3 or 4 c.c. of normal salt solution, he substituted 10 or 15 c.c. of antimeningitic serum, which at that time was believed to be entirely harmless. From this, however, he also obtained severe reactions. There developed elevation of temperature, 2° to 4°, headache, sometimes nausea, a partial Kernig's sign and pains in the legs, all of which appeared two or three hours after the injection, reaching their maximum degree at the fifth or sixth hour and disappearing on the second day. Three or four hours after the injection, the spinal fluid became cloudy and contained abundant polymorphonuclear cells which progressively were replaced by lymphocytes, the latter sometimes remaining over two months.

Sicard and Salin had occasion to hold a necropsy on an adult who had died a few days after an injection of 20 c.c. of antimeningococcic serum which was made because meningeal complications of an existing bronchopneumonia were feared. There was no meningitis, however, as the spinal fluid obtained prior to injection was perfectly normal, but the necropsy showed that intense congestion of the spinal meninges had been produced and there was a marked leucocytic infiltration of the pia, most marked in the posterior lumbosacral region, which infiltration, however, could be traced upward as far as the bulb. The author accounts for the failure to recognize this reaction in cases of actual meningitis by the masking of the symptoms of the reaction by the more severe meningitic symptoms.

The author cites several instances showing the dangers of failing to recognize the existence of this serum reaction. Thus the occurrence of reaction has led to repeated further injections of serum, the physician misinterpreting the increased severity of the symptoms as indications of an aggravation of the meningitis which called for more serum. In one case of suspected meningitis, spinal fluid was sent to the laboratory and found

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(3) Presse Méd., Nov. 26, 1910.

entirely normal. The next day the attending physician sent word that the laboratory diagnosis was wrong and that the patient undoubtedly had meningitis, and as evidence, he sent a test-tube containing cloudy spinal fluid containing an abundance of leucocytes. The latter were free from degeneration, however, and no microorganisms were found. On investigation, it was found that the physician had injected 20 c.c. of antimeningitic serum after the first lumbar puncture. It turned out that the case was simply one of streptococcic tonsillitis in a neuropathic subject, and in three days the patient was entirely well, the entire meningeal reaction being due to the serum. On account of this danger of severe reaction Widal has recently insisted that serum should not be injected until the presence of meningitis has been demonstrated by examination of the spinal fluid.

OTHER FORMS OF MENINGITIS.

The Prognosis of Pneumococcic Meningitis forms the subject of an article by H. Schlesinger[4] who arrives at the following conclusions:

Pneumococcic meningitis may be serous or suppurative. The serous forms may be produced by toxic action and are occasionally, especially in the aged, of very long duration. Kernig's sign and rigidity of the neck are the most persistent features.

The suppurative forms do not give an absolutely unfavorable prognosis. Lumbar puncture and injection of pneumococcic serum appear to be useful. Even when complicated by encephalitis this form may result in healing. It may occur in the course of disease of the respiratory tract, endocarditis or otitis or as an independent affection.

The onset may be apoplectiform, acute, subacute or insidious. The fever is of shorter duration and less severe than in the epidemic form of meningitis. Euphoria appears soon after the subsidence of the fever. The frequency of the pulse is usually less than in the epidemic form. Herpes labialis is frequently present.

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(4) Wien. med. Wochenschr., 1911, p. 40.

Herpes in other locations or of unusual extent is rare. Optic neuritis occasionally appears.

Tuberculous Meningitis. O. Fischer[5] analyzes 260 undoubted cases of tuberculous meningitis from the clinic at Leipsic. Fifty-seven of the patients were over 40 years old; 18 of these were between 51 and 60 years, and the age of the oldest patient was 78 years. In 2 cases the onset followed injury and once a psychic trauma. In most of the cases the base of the brain was affected, the convexity in only one-eighth of the cases. In only 2 cases was it impossible to find a primary tuberculous focus.

The author looks upon retention of urine as an almost pathognomonic symptom as it occurred in practically all of the cases. Rigidity of the neck was frequent, but not constant. The usual duration was 5 to 14 days, the shortest, 1½ days; the longest, 7 months. One case was mistaken for myelitis because there were paralysis and anesthesia below the level of the nipples and incontinence of both urine and feces; there was, however, also facial paresis. The necropsy disclosed basal and spinal meningitis, and softening in the temporal lobe and thalamus. All the cases were fatal.

Lumbar puncture was máde in 25 cases and was of palliative value. In 22 of these cases there was distinct lymphocytosis. Tubercle bacilli were found in one case. Two unusual and opposite cases are related. A man in the last stage of heart disease was brought to the hospital *in extremis* and died of heart failure. There were no meningeal symptoms, but necropsy showed a severe tuberculous meningitis. The other case was that of a man of 44 years with all of the text-book symptoms of the disease, including the "hydrocephalic cry." At the necropsy there was advanced pulmonary and intestinal tuberculosis but no lesion whatever in the brain.

Influenzal Meningitis. Serum Treatment. Flexner[6] points out the comparative frequency of this disease as well as its great fatality, all but 6 of the 58 cases hitherto reported having terminated fatally. It is probable that the infection of the meninges is always sec-

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(5) Münch. med. Wochenschr., 1910, No. 20.
(6) Jour. Amer. Med. Assoc., July 1, 1911.

ondary to infection of the respiratory tract. Moreover, all or nearly all cases are examples of bacteriemia since the bacilli have frequently been cultivated from the blood during life or at necropsy. Animal experiments at the Rockefeller Institute led to the production of severe and usually fatal meningitis in monkeys, produced by subdural injection of cultures of the influenza bacillus. Symptoms appeared about five hours after the injection, and death sometimes resulted thirty-six hours after the injection. The bacilli were found to multiply actively, and were rarely taken up by the abundant leucocytes present in the membranes and fluid. The bacilli rapidly invaded the blood and sometimes secondary inflammation of the lungs and pleuræ was produced.

Dr. Wollstein succeeded in preparing an immune serum by means of repeated injections of virulent cultures in the goat. This serum was found capable of regularly preserving the life of monkeys which had been inoculated with the influenza bacillus. The serum produced arrest of the multiplication of the bacilli and a free phagocytosis, and the spinal fluid, at first turbid or purulent, became clear in three or four days. The bacteriemia also disappeared and complete recovery resulted.

Flexner concludes his brief report with the following statement: "In view of the severe conditions surrounding influenzal meningitis in human beings, it would seem desirable to apply the serum to the treatment of the spontaneous disease. If this should be done, then every effort should be directed to the making of the bacteriologic diagnosis at the earliest possible moment, and the employment of a serum that has been prepared with virulent influenza bacilli and that shows a high degree of opsonic value. The manner in which the serum should be employed in human beings is indicated by the manner in which the serum for epidemic meningitis has come to be applied successfully. The testing of the anti-influenzal serum will be confined, for the present, to a few places in which its effects can be carefully observed and controlled before it is offered for more general use."

Typhoid Meningitis. Claret and Leon-Caen[7] classify the cases of meningitis arising in typhoid fever in three groups. A. That caused by the *Bacillus typhosus.* B. Mixed infection. C. Meningitis entirely caused by another infection. The authors occupy themselves with the first class. Clinically these cases of meningitis caused by the typhoid bacillus occur in two forms. In the first group are those cases with a meningeal onset, while the further course may resemble either meningitis or ordinary typhoid. In the second form, the meningeal symptoms commence in the fourth week or during convalescence. Certain diagnosis can be made only by lumbar puncture. The prognosis is relatively good. Of 13 undoubted cases, 8 recovered completely.

V. C. David and F. A. Speik[8] also review the subject and employ the classification given in 1904 by R. Cole:

1. Meningism. Symptoms of meningitis are present but there are no meningeal lesions and no direct relation between the bacteria and the symptoms. This condition is produced by the toxins in other specific fevers.
2. Serous meningitis of Quincke, in which there are symptoms of meningitis; the brain shows, microscopically, edema and round-cell infiltration, and a serous exudate is present, in which is found the typhoid organism.
3. Suppurative or purulent typhoid meningitis.

For purposes of more definite classification the authors prefer to subdivide Class 3 into purulent typhoid meningitis with and without intestinal lesions.

These authors report 3 cases from the Cook County Hospital, Chicago. The first one was a middle-aged man who, in the fourth week of typhoid fever, developed consolidation of the lower lobe of the right lung and a few days later, signs of meningitis in the form of stiffness of the neck and Kernig's sign. The spinal fluid escaped at the rate of only 6 drops per minute, and cellular elements in the fluid were few but the typhoid

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(7) Gaz. des Hôp., 1910, No. 50.
(8) Jour. Amer. Med. Assoc., Mar. 25, 1911.

bacillus was obtained in culture. The patient died a week later but necropsy was not obtained. The authors consider this case one of serous typhoid meningitis.

The second case was that of a child 4 years old with marked clinical symptoms of meningitis and hyperpyrexia, the temperature reaching 107° F. The spinal fluid was under increased pressure and turbid. It contained equal numbers of polymorphonuclear and mononuclear cells and many thin, short bacilli which were Gram-positive. The necropsy revealed the usual typhoid lesions and purulent meningitis. The typhoid bacillus was obtained in pure culture from the exudate at the base of the brain, lateral ventricles and spinal cord. The 3d case was one of suppurative typhoid meningitis in which the typhoid bacillus was isolated from the cerebrospinal fluid during life and at necropsy. There were no intestinal lesions but the spleen was considerably enlarged and soft.

The authors also made lumbar puncture with bacteriologic examination of the fluid in 12 other typhoid cases. Their conclusions are as follows:

Typhoid bacilli are not found in the cerebrospinal fluid in uncomplicated cases of typhoid fever.

Typhoid patients suffering the ordinary nervous manifestations, such as delirium, involuntary discharges, carphologia and severe headache are not benefited by withdrawal of cerebrospinal fluid, although the fluid may be under increased tension.

In typhoid patients showing classical symptoms of meningitis, the cerebrospinal fluid may be sterile, but lumbar puncture and withdrawal of fluid has improved the clinical condition in a striking way in some cases.

When typhoid fever patients show meningeal symptoms, such as rigidity of the neck, Kernig's sign, convulsions, strabismus or irregularity of the pupils, lumbar puncture should always be done, and the fluid obtained examined bacteriologically and microscopically.

Coccidioidal Meningitis. In both blastomycosis and the closely related so-called "coccidioidal granuloma" the skin is the most frequent seat of disease, but the infection sometimes becomes generalized. In such cases the nervous system may be affected. An account of the occasional cerebral complications of the former disease may be found in the *Practical Medicine Series,* 1909, Vol. 10, p. 84. A case of the coccidoidal form of the disease, which seems to be practically limited to the Pacific coast, is reported from the San Joaquin Valley of California by Ryfkogel.[9] When 2 years old, the patient developed numerous subcutaneous abscesses but the skin itself was not involved. Examination of the pus revealed the characteristic fungus. The patient recovered after the opening of the abscesses, curetting and swabbing out with formalin, and the internal administration of syrup of hydriodic acid and formic acid.

A year and a half later the child was taken ill with headache, vomiting, fever and delirium. The fever lasted a month and the child's mind began to deteriorate. Rigidity of the limbs reappeared and three months after the onset the patient again came under the author's observation. The head had enlarged rapidly and the child was blind and nearly deaf and practically devoid of all mentality. Both optic discs were atrophic. Lumbar puncture was made and of the cells in the spinal fluid, 60 per cent. were polymorphonuclear. Cultures were negative. As epidemic meningitis was suspected, antimeningitic serum was given, but the patient had a severe reaction, the temperature rising to 107° F., and died.

At the necropsy the base of the brain was found to be covered by slightly pinkish exudate varying in thickness from 2 to 10 mm. There was marked dilatation of the ventricles. On histologic examination numerous areas very similar to tubercles were found. They consisted of giant cells, endothelioid cells and mononuclear round cells. Many of the giant cells contained young forms of the fungus coccidioides, and the organisms were obtained in culture.

Actinomycotic Meningitis. Ravaut and Pinoy[1] report what they [incorrectly.—Ed.] claim to be the first recorded human case of this affection. The patient, a

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(9) Jour. Amer. Med. Assoc., Nov. 12, 1910.
(1) Presse Méd., Jan. 21, 1911.

boy of 16 years, had lived the first 14 years of his life in the Argentine Republic where actinomycosis is prevalent. He first developed otitis media, followed by mastoid abscess, and a month after the onset meningeal symptoms appeared. Lumbar puncture revealed a clear fluid under increased pressure and containing numerous cells, lymphocytes predominating. The actinomyces was obtained in pure culture. The patient recovered.

[Quervain[2] reported the case of a man with otitis, mastoiditis and abscess of the neck from which actinomyces was obtained in pure culture. Finally the patient became stuporous, and at the necropsy actinomycotic basal meningitis was discovered.—Ed.]

Cysticercus Meningitis. Henneberg[3] reports a case of cysticercus meningitis with severe inflammatory changes in the meninges which first led to a diagnosis of gummatous meningitis. The patient, a man of 37 years, was taken ill 3½ years before death with headache. Examination revealed a sluggish reaction of the pupils, optic neuritis, affection of the abducens and auditory nerves, unsteady gait, increased knee-jerks, delirium and mental weakness. Later vomiting, blindness, deafness and epileptiform attacks developed. Finally the neck became stiff, the tendon reflexes disappeared, there were contractures of the arms and legs, marasmus and complete dementia. At the necropsy there was fibrous thickening of the pia mater at the base of the brain and of the cervical dura mater, and the spinal arachnoid, especially in the midthoracic region, was converted into a layer of granulation tissue several millimetres thick in which the posterior roots were embedded. Remains of cysticerci were found in these lesions. Hydrocephalus and severe ependymitis were also present. The granulation tissue differed from gummatous tissue by the slight vascular changes, a different type of infiltrating cells, a lack of tendency to necrosis and lack of extension to the cord substance.

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(2) Deutsche Zeitschr. f. Chir., 1899.
(3) Neurol. Centralbl., 1911, p. 344.

Carcinomatous Meningitis. M. Lissauer[4] reports the case of a woman of 47 years of age who for 16 days had about 10 daily attacks of generalized convulsions, and also had vomiting, vertigo and occipital headache. There was no pain. Both discs were choked. Paralysis of the extremities of an ascending type developed rapidly and the tendon reflexes disappeared. Finally there was anesthesia of the cornea with neuroparalytic keratitis, and the ocular muscles became paralyzed. The clinical diagnosis was tumor of the brain, probably in the posterior fossa. Necropsy revealed carcinoma of the cecum, but no brain tumor or other gross brain lesion. On microscopic examination, however, the pia mater both of the base and convexity of the cerebrum and of the medulla oblongata was found to be diffusely infiltrated with carcinoma.

The whole subject of carcinomatous meningitis is reviewed by Schwarz and Bertels[5] who report the case of a man of 35 years of age who presented a clinical picture somewhat resembling tuberculous meningitis, but without fever. The spinal fluid escaped under increased pressure and contained a large number of cells of epithelial character and of a size 10 to 15 times that of a lymphocyte. Only the brain was secured post-mortem and this to the naked eye showed merely a slight whitish thickening of the pia of the convexity. On histologic examination, however, infiltration of the meninges by the epithelial cells was seen. Carcinoma of the stomach was suspected clinically. There are several cases in the literature of metastatic carcinoma of the meninges invisible to the naked eye. The primary tumor was frequently in the stomach.

PACHYMENINGITIS.

Pachymeningitis and Trauma. Quincke[6] has carefully studied the clinical symptoms and the conditions of the cerebrospinal fluid in 14 cases, and begins with the statement that in diseases of the dura, inflammation and hemorrhage can not be kept separate. The general

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(4) Deut. med. Wochenschr., 1911, No. 1.
(5) Deutsche Zeitschr. f. Nervenheilk., 1911, p. 85.
(6) Deutsche Zeitschr. f. Nervenheilk., Vol. 40, p. 79.

brain symptoms are usually more pronounced than the focal unilateral ones. Although we would expect the symptoms to depend mainly on the mechanical effect of the extravasated blood it is found that the observed increase in spinal pressure bears only an ill-defined relation to the time of occurrence and degree of hemorrhage. Thus, the pressure may at first be low after a large hemorrhage. It may subsequently rise without a new hemorrhage having occurred. Hence it must be assumed that the extravasated blood may injure the brain substance chemically, or as a foreign body excite exudation on the part of the meninges or displace the efferent lymph channels. In contradistinction to intracerebral hemorrhage, the extravasation is usually slow, and it may frequently recur so that the symptoms are likely to come on more gradually and successively than in cases of subdural hemorrhage.

Trauma is the principal cause of hemorrhagic pachymeningitis, such as a fall on the head or the falling of a heavy object upon the head or a kick by a horse. In most cases, symptoms of concussion are first present. Then there often follows an interval of days, weeks or even months before the symptoms of pachymeningitis set in. The chief complaint is headache of variable intensity, often associated with dizziness and vomiting, with general lassitude and inertia, exhaustibility, impaired mental concentration, frequently also sensitiveness to noises and insomnia. Transient external influences readily aggravate certain symptoms. Thus the headache is intensified by motion, mental efforts, excitement, heat or horizontal position; the tendency to vertigo by sitting up or any change in position. Not only the pulse-rate but the blood-pressure is subject to variation from exceedingly trivial causes. During lumbar puncture there are frequent spontaneous variations in pressure, more marked than in other conditions.

It is noteworthy that in half of the cases reported the only objective finding was increased pressure of the cerebrospinal fluid. In rare cases lymphocytosis was present but there was never any increase of albumen in the fluid. In the old cases, the symptoms in those without increased pressure were not different from those with increased pressure, so other causes than pressure must be operative, probably such as thickening of the dura, changes in the lymphatics and disturbance of the circulation of the blood. One sign pointing to increased meningeal irritability was the frequency of pain following lumbar puncture even when very little fluid was removed. This pain often did not occur until four to six hours after the puncture.

In order to prevent as far as possible the occurrence of post-traumatic pachymeningitis, Quincke lays down the rule that persons who have sustained a head injury shall be kept in bed for a few days after the injury, even if the symptoms are very slight, and that great care shall be taken in making the transition from rest to exercise and work very gradual. Lumbar puncture is of therapeutic value in fresh cases and during exacerbations. In old cases leeches and the production of artificial suppuration in the scalp by tartar emetic were frequently found to be of value.

CEREBRAL LOCALIZATION.

Retrobulbar Neuritis as a Diagnostic Sign of Frontal Lobe Lesions. Foster Kennedy[8] has found as definite signs of expanding lesions of the frontal lobe, such as tumor or abscess, the existence of a symptom-complex consisting of true retrobulbar neuritis with central scotoma and primary optic atrophy on the side of the lesion together with concomitant choked disc in the opposite eye. He calls attention to the fact that the macular bundle which subserves central vision lies as a wedge-shaped bundle toward the outer side of the optic nerve, the apex of the wedge being directed mesially while the base is covered completely by fibers coming from retinal areas other than the macula. This bundle is more fragile than the rest of the nerve so that pressure exerted on the nerve first causes deterioration of function and later a primary atrophy of the macular fibers with loss of central vision, while the remainder of the nerve

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(8) Amer. Jour. Med. Sciences, September, 1911.

retains its functional activity, at least for a time. In case of a lesion in the frontal lobe which at first not directly implicates the optic nerve, the general rise of intracranial pressure will produce bilateral choked disc without central scotoma or a loss of visual acuity. If now the tumor or abscess grows it will finally press directly on the upper surface of the optic nerve on the same side with the result that on this side the macular bundle will degenerate, central vision will quickly diminish, central or paracentral scotoma will develop, and in a few days the temporal part of the disc will be pale as the result of beginning atrophy which soon spreads to the entire disc. In the opposite eye, where the optic nerve merely remains affected by the general increase in pressure, the choked disc remains unaltered. Needless to say the author is a believer in the "mechanical" theory of choked disc.

Six cases are reported in 5 of which the accuracy of the diagnosis was proved by operation. In these cases diminution or loss of the sense of smell was also found on the side of the lesion, as would be expected from the proximity of the olfactory bulbs to the optic nerves.

Case 1 was that of a woman 37 years old in the service of Sir William Gowers. Two years before admittance she began to suffer from headaches of increasing severity, followed by attacks of fainting and vomiting. A year later she began having transient blurring of vision in the left eye and later weakness slowly developed in the left arm and leg. The sense of smell was completely absent on the left side and later also on the right side. The left optic disc was clear, its vessels rather below normal in size, its color grayish, particularly in the temporal portion. Vision in the left eye was greatly reduced. The right eye presented a choked disc with a swelling of 5 diopters, while vision was normal. The fields are shown in Fig. 2, the most noteworthy feature being the central scotoma on the left side. The pupils were equal and reacted briskly to light, but the contraction of the left one was not sustained. It quickly dilated again although illumination was maintained, a phenomenon so characteristic that it has been designated

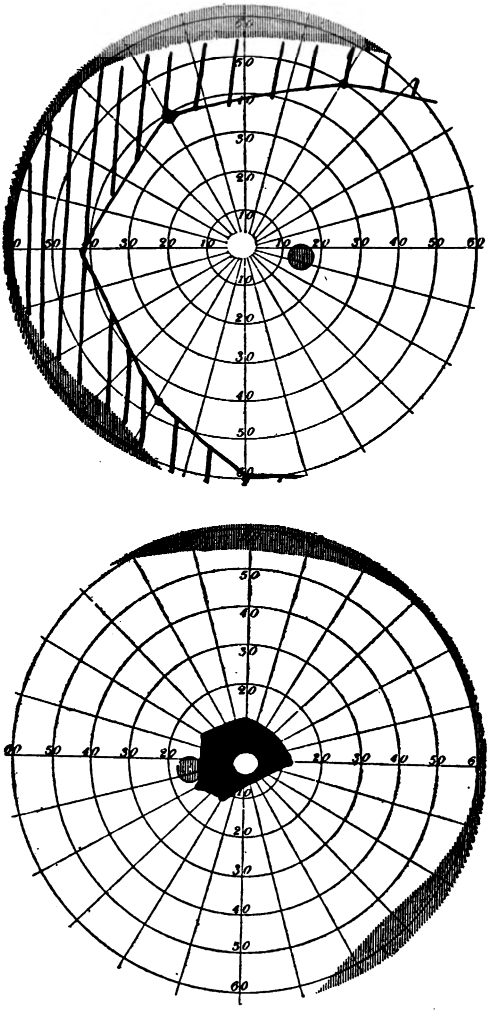

Fig. 2.

Visual fields in frontal lobe tumor showing central scotoma. (Case 1.)

the "retrobulbar reaction" by the late Marcus Gunn. The left arm and leg were distinctly paretic with increased tendon reflexes and diminished abdominal reflex. Sensation was normal.

Sir Victor Horsley attempted removal of the tumor by his two stage method but the patient died after the initial decompression. The necropsy revealed a hard endothelioma at the base of the frontal lobe which had originated from the dura over the crista Galli. The left olfactory bulb was obliterated and the left optic nerve was directly pressed upon. There was no distension of the left optic nerve sheath while the right sheath was markedly distended. These findings fully explained the ocular symptoms, and the central scotoma was explained by the finding on histologic examination of a compact fasciculus of degenerated fibers in the outer part of the nerve. The rather perplexing fact of having hemiplegia on the side of the lesion instead of on the opposite side as is customary was explained by the fact that the tumor extended backward on the right side so as to compress the motor fibers.

Cases 2 and 3 showed similar features while in the other three cases choked disc was at first observed on both sides, and later the signs of retrobulbar neuritis were substituted on the side of the tumor.

One of these (Case 5) was that of a woman 30 years of age who had been subject to fainting attacks since the age of 7 years. In the summer of 1906 she began to suffer from frontal headaches which in the next two years became very severe and were occasionally associated with transient dimness of vision, especially in the right eye. In August, 1909, she lost the sense of smell in the right nostril and vision in the right eye became so reduced that she was able to make out only the forms of large objects. The fields (Fig. 3) show a large central scotoma on the right side together with considerable concentric narrowing on both sides. Both discs were swollen to the extent of 3 diopters, and the right one also showed evidence of atrophy as it was white and the arteries were very markedly reduced in size. There was a coarse tremor in the right hand and the deep reflexes

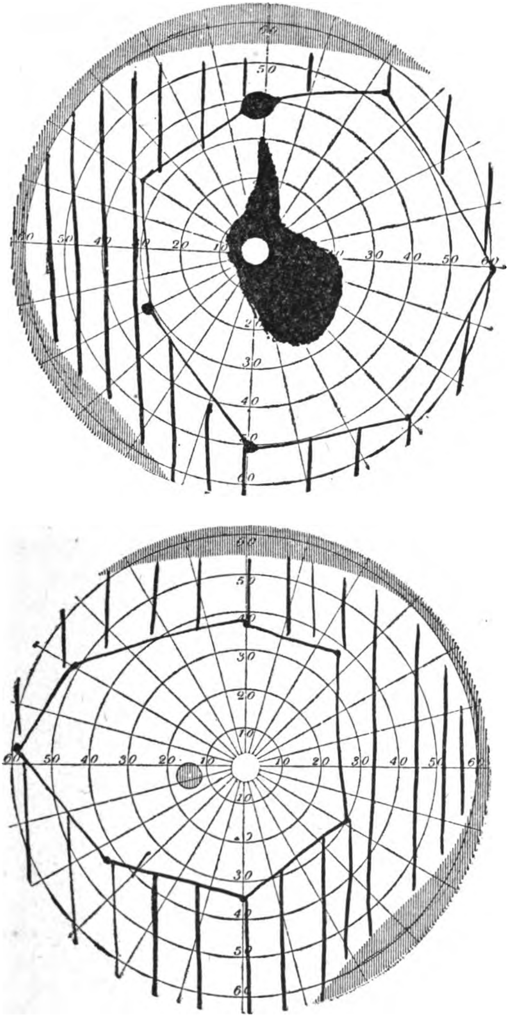

Fig. 3.

Visual fields in frontal lobe tumor showing central scotoma and concentrate narrowing. (Case 5.)

were increased on the left side. The patient showed mental symptoms such as have been considered of focal value in frontal lobe lesions, as follows: "The patient was very excitable, laughed foolishly and causelessly, joked feebly and inappositely, was very ready to take offense and on the other hand was effusively apologetic over trifles." There was no speech affection. In November, 1909, Sir Victor Horsley made a large osteoplastic flap over the right frontal region and a week later the dura was incised. The pressure was greatly increased. No tumor presented itself on the surface but on incising the frontal lobe a hard fibrous growth was found in its interior almost resting on the orbital plate. It was easily removed. The choked disc completely disappeared and vision improved in the left eye.

Lesions of the Corpus Striatum. C. Vogt[9] reports 2 cases. Case 1. A woman, 23 years old, had had spasms and athetoid movements of the entire musculature of the body, except the eyes, since childhood, and severe pseudobulbar speech disturbance. There was no paralysis. Examination of the brain showed atrophy of the caudate nucleus and putamen on both sides. The internal capsule was almost twice as broad as normal. Throughout the brain there was an increase in medullated fibers; otherwise the brain was normal.

Case 2. A woman, 77 years old, had a tendency to turn the head to the right and there were athetoid movements in the right hand. There was marked scoliosis with the convexity to the left, and the right thigh was turned inward. There was bilateral pes equino-varus. Passive movements of the lower extremities met with great resistance on account of spasms and contractures, but the active movements appeared to be strong and there was no paralysis. The left knee-jerk was normal, the right one decreased. The ankle-jerk was absent but Babinski's toe-sign was present on the right side. The necropsy revealed atrophy of the caudate nucleus and putamen. The internal capsules were broad. Otherwise there were no changes, particularly not in the cortex or pyramidal tracts.

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(9) Neurol. Centralbl., Apr. 1, 1911.

Similar cases in the literature show that spastic conditions with athetoid movements and pseudobulbar paralysis may occur as an isolated clinical picture due to lesions of the caudate nucleus and putamen. The muscular spasms are explained as the result of the loss of the normal inhibitory influence of the corpus striatum. The bundles of densely packed medullated fibers met with in these cases are explained as due to transformation of non-medullated into medullated fibers. The author believes that we are justified in designating as the "syndrome of the corpus striatum" the combination of spastic diplegia, bilateral athetosis and pseudobulbar paralysis. In the discussion of this report attention was called to the resemblance of this syndrome to many cases of paralysis agitans in which disease lesions in the corpus striatum have been frequently described.

Lesions of the Parietal Lobe. Bianchi [1] has convinced himself that a distinct symptom-complex of parietal lobe lesions exists. Its principal features are: 1. More or less rapid and complete disappearance of paralysis a certain length of time after the stroke; no great exaggeration of the tendon reflexes; Babinski's sign absent. 2. Hemianesthesia and loss of stereognostic sense are almost constant. 3. Hemianopsia is frequent. 4. Alexia, agraphia or dysgraphia are constant. 5. Word-deafness is absent and paraphasia is rare. 6. The patients can repeat phrases spoken to them but cannot write spontaneously or copy. 7. Dissociation of thought is present only in certain cases, the intelligence disturbance showing itself only in patients who read and write and possess a certain amount of culture, while illiterate patients show no appreciable diminution of intelligence.

The Significance of Left-Handedness was discussed by the *Berlin Neurological Society*. Stier [2] has studied 300 left-handed soldiers. He pointed out that such movements only should be used as tests as are not directly taught by others and not performed with instruments exclusively made for right-handed use. Suitable are breadcutting, cracking of a whip, mixing cards, etc. Most of the men, but not by any means all of them, were

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(1) Riforma Med., Jan. 1, 1911.
(2) Arch. f. Psych., Vol. 48, p. 410 and 419.

stronger in the left arm. In at least half the cases the condition was frequent in the family, and about twice as frequent in the male members. By the use of special tests it was found that these persons were also more adept with their left foot. On the basis of extensive comparisons Stier concluded that the left-handed soldiers were inferior to the right-handed ones, that they were less frequently promoted and more frequently punished. Among soldiers suffering punishment 14 per cent. were left-handed, while of the total regiment 4.6 per cent. were left-handed.

Alfred Rothschild presented a girl 18 years old who had been brought to him at the age of 4 years on account of pronounced and apparently incorrigible left-handedness. He gave her three hypnotic treatments, each time grasping her right hand firmly and suggesting that it was to be used for everything. Since then she has been completely right-handed, not at all ambidextrous. There were no other left-handed persons in the family, and the girl was not at all hysterical.

Both Stier and Liepmann doubted that this case was one of genuine left-handedness and considered success with hypnotic treatment impossible in a genuine case where the right cerebral hemisphere prevails over the left. Liepmann recalled Lombroso's investigations which showed left-handedness to be very frequent among criminals and epileptics, and that Redlich had explained this frequency among the epileptics on the ground of an early acquired left-sided cerebral lesion. Several members called attention to the relative frequency of stammering and other speech defects among the left-handed. Slight deviations of the tongue to the right have been found in stutterers and in the left-handed, suggesting slight weakness on the right side. [It must be remembered that in right hemiplegia or hemiparesis the tongue deviates to the right side because the stronger muscles on the left side push the left side of the base out more strongly.—Ed.]

Rothman reported a case which shows that left-handedness acquired in infancy does not necessarily cause the speech center to develop on the right side of the brain. A newspaper editor who had become left-handed following a right hemiparesis which developed at the age of nine months had at the age of 60 years an apoplectic attack causing paralysis of the right arm and aphasia; this fact showed that his speech center was on the left side.

M. Schäfer,[3] physician to the public schools of Berlin, questioned the parents of 18,000 children on various points connected with the problems of left-handedness. He found that 4.06 per cent. were left-handed, 5.15 per cent. of the boys and 2.98 per cent. of the girls; 0.21 per cent. were ambidextrous. Heredity of left-handedness from parents to children existed in 16 per cent.; from the grandparents, omitting one generation, in 8.23 per cent. In 2.45 per cent. of the cases the condition had existed in three generations. The usual position in sleep in the right-handed children was on the right side in 38.2 per cent., on the left side in 16.1 per cent., on the back or variable 45.7 per cent. In the left-handed the results were: right side, 22.4 per cent.; left side, 27.9 per cent.; back and variable, 49.7 per cent. Of the left-handed children 2.3 per cent. had disturbances of speech, while the percentage for the total number was 0.7. Mirror writing with the left hand was found in 42 per cent. of the left-handed.

A Case of a Right-Handed Person with the Speech Center on the Right Side is reported by Lewandowsky.[4] This person had suffered from essential tremor since youth and gradually developed left hemiplegia, left hemianesthesia and hemianopsia together with aphasic disturbances (alexia and agraphia), and right-sided apraxia. In the white matter of the right cerebral hemisphere was a glioma which interrupted the optic radiations, hence the hemianopsia, and also affected the internal capsule.

VASCULAR LESIONS.

Two Cases of Recent Multiple Hemorrhages in the Brain are reported by A. Souques[5]. Case 1. A man

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(3) Berlin. klin. Wochenschr., 1911, No. 7.
(4) Zeitschr. f. die gesammte Neur. und Psych., Vol. 4.
(5) Nouv. Icon. de la Salp., 1911, p. 193.

of 64 years of age was suddenly taken with convulsions during the night. Afterwards there was deviation of the eyes to the right, with quick nystagmus. Both legs were rigid, the right one more so, with increased reflexes. The right leg appeared weaker than the left. The following evening he had another convulsion involving only the right side of the face and the right arm. Lumbar puncture yielded a clear fluid, under increased tension, with numerous leucocytes, polymorphonuclear cells predominating. On the next day the deviation of the eyes had disappeared but there was distinct paralysis of the right arm and leg. The urine contained abundant albumen. Later in the day there was another convulsion, involving the right leg, and on the day after, all four extremities were rigid. A week later he had a slight convulsion, and then had none for three months, when another attack occurred followed by left hemiplegia. He died on the same day after more convulsions which involved the right arm. There were found three small meningeal hemorrhages in the right cerebral hemisphere, a large one in the left hemisphere, several small ones in the interior of both hemispheres, three in the interior of the cerebellum, and one subarachnoid hemorrhage in the dorsal region of the cord. Altogether there were 28 recent and 3 old hemorrhages. The brain vessels showed marked arteriosclerosis. Only the brain and cord were examined.

Case 2. A man, 68 years old, was confined to bed for three years. He finally became semicomatose but moved his limbs. The tendon reflexes were found to be slightly increased, more so on the right side. The blood-pressure was high and the urine contained albumen. He remained somnolent for three months, with Cheyne-Stokes respiration. The necropsy revealed hypertrophied heart and small granular kidneys. The brain showed no external change, but in the interior there were 11 separate hemorrhages, some of them of large size (see Plate III). In both cases the hemorrhages are ascribed to Bright's disease, arteriosclerosis and hypertension.

The Relationship Between Vascular Diseases of the

Retina and Brain are discussed by Franz Geis[6] on the basis of the rich material of Uhthoff's clinic. As the retinal arteries can be directly observed, and as they are branches of the internal carotids like most of the brain arteries, and like these end-arteries, their condition naturally may be expected to correspond more closely to that of the cerebral vessels than does the condition of the peripheral arteries. The available material comprised over 100,000 patients. Some 250 cases with vascular changes were kept under observation until death, and many were studied post-mortem. These cases, first of all, teach the important lesson that while retinal arteriosclerosis invariably is associated with sclerosis of the larger brain vessels, the latter may be severely altered without changes in the retinal vessels. Hence a normal condition of the vessels in the fundus is no proof that the brain vessels are not diseased. From the study of this rich material as well as of the literature the author makes the following summary:

1. Ophthalmoscopically certain sclerosis of the retinal vessels, as indicated by marked indentation of the veins by the arteries and thickening of the walls occasionally with hemorrhages, is generally bilateral and part of a general vascular disease of the brain vessels, which as a rule leads to apoplectic strokes, and hence is of grave prognostic significance.
2. Sudden occlusion of the central artery of the retina or of one of its branches usually also points to similar sclerotic changes when occurring in a person over forty years when other causes, particularly a heart lesion, do not exist. In these cases, however, the apoplectic strokes may be postponed for a long time.
3. No definite prognostic significance can be attached to sudden occlusion before the age of 40 or when heart disease is present.
4. Syphilitic changes in the retinal arteries are rare and not of the same significance as those of ordinary arteriosclerosis.
5. Venous thrombosis is in only 40 to 50 per cent. of the cases an advance sign of cerebral arteriosclerosis

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(6) Klin. Monat. f. Augenheilk., January, 1911.

which after many years may lead to a stroke, and in the other 50 per cent. remains a local affection. Even in the presence of other arteriosclerotic signs elsewhere, and albumen in the urine strokes occurred only in 80 per cent., while 20 per cent. had remained well for many years.

6. Sclerosis of the choroidal vessels does not permit of any conclusions as to the condition of the cerebral vessels.

7. Retinal hemorrhages in the presence of arteriosclerosis, diabetes and chronic nephritis usually are precursors of cerebral hemorrhage, less often of thrombosis, which, however, may not appear for several years.

8. The same prognostic importance belongs to retinal hemorrhages which in the absence of other known etiologic factors must be considered arteriosclerotic. An exception exists in the recurrent vitreous and retinal hemorrhages in young people, the etiology of which is in the dark.

9. Isolated macular and preretinal hemorrhages are of only local importance.

10. Retinal hemorrhage in syphilis has no general prognostic value.

11. In the presence of retinal hemorrhage high blood-pressure is a dangerous sign.

12. Retinitis albuminurica is usually a sign that death soon will take place (except in pregnancy), and in between 1/4 and 1/3 of the cases apoplectic strokes set in. The isolated retinal hemorrhages in chronic nephritis are frequent precursors of cerebral hemorrhage but the prognosis as to life is less serious.

13. One-half to one-third of patients with diabetic retinitis developed strokes, but it is less serious as to life than the albuminuric retinitis, since only about one-half of the patients died within 2 or 3 years.

14. Hemorrhages in the vitreous humor are of less prognostic importance than those in the retina, and do not allow definite conclusions as to the condition of the cerebral vessels.

15. Hemorrhages in the sclera often take place from perfectly healthy vessels, and even in old age need not

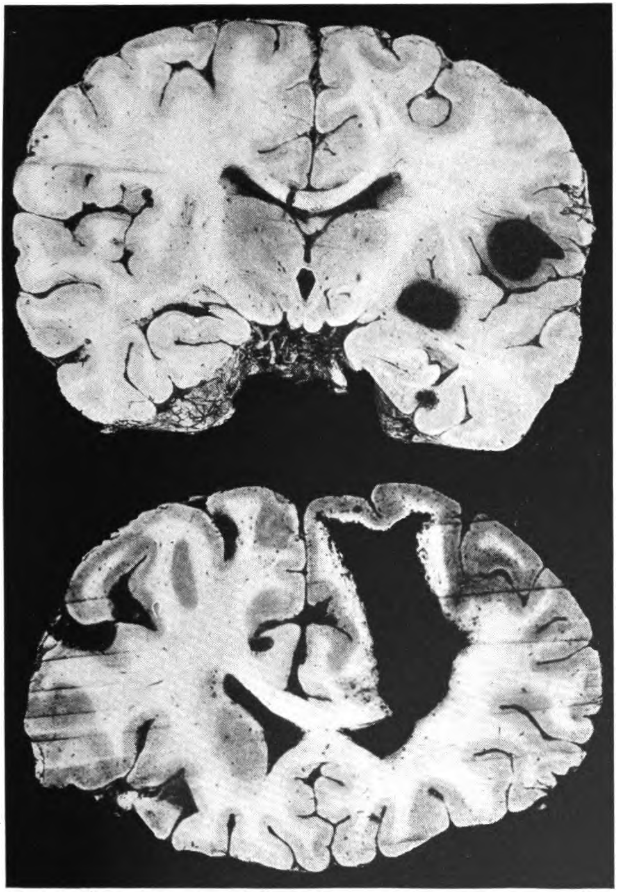

PLATE III.

Multiple hemorrhages of the brain.—Souques. (Page 77.)

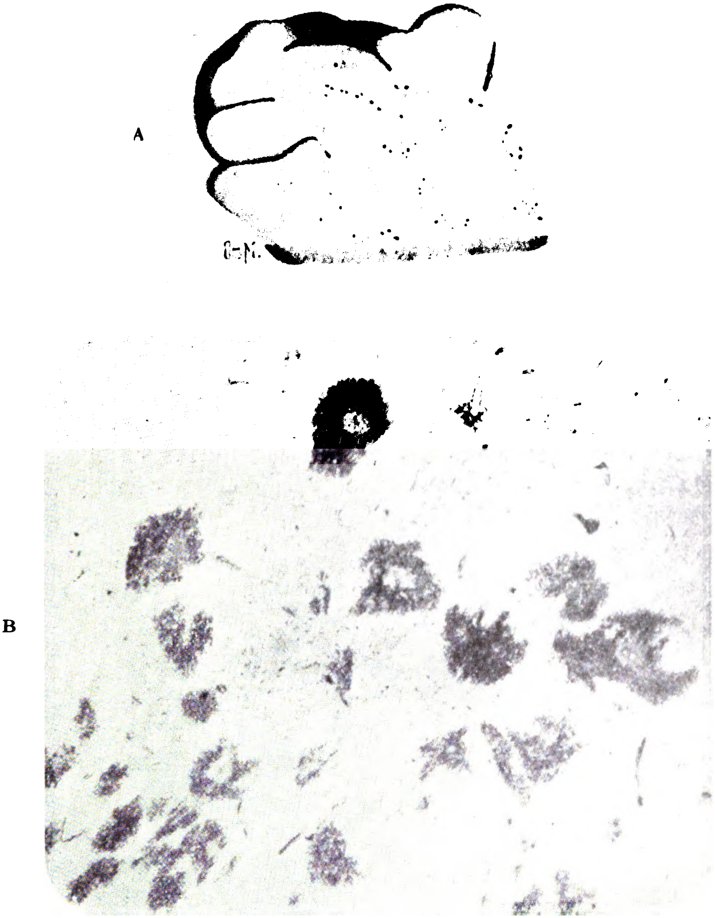

PLATE IV.

Fat embolism of brain following fracture of leg.

A. Naked eye appearance of section of frontal lobe showing small hemorrhagic spots.

B. Microscopic appearance of same.—Nils Backer Gröndahl. (Page 82.)

be evidence of vascular degeneration. They may be looked upon only as forerunners of apoplexy when retinal hemorrhages also occur.

Thrombosis of the Vertebral Artery. Lüdin[7] reports the case of a man 68 years old, upon whom this diagnosis was made clinically. Without loss of consciousness he suddenly developed paralysis of deglutition and loss of the pain- and temperature-sense on the right half of the body below the neck and of the left half of the forehead. Motion in the extremities and tactile sense were not affected. The left corneal reflex was absent as well as the left patellar and ankle-jerks. The left pupil and palpebral fissure were narrowed, and the left vocal cords and left side of the palate were paralyzed. After five days the patient died of aspiration pneumonia. Two cm. below the junction of the vertebral arteries, the left one presented a fusiform aneurysmal dilatation which was entirely occluded by a firmly adherent thrombus. A focus of softening 8 mm. long and 6 mm. wide was found on the left side of the medulla oblongata at the level of the middle third of the olive. It involved the formatio reticularis, the substantia gelatinosa Rolandi, the spinal root of the fifth cranial nerve, the nucleus ambiguus of the vagus, the tractus spino-cerebellaris, spino-tectalis, spino-thalamicus and part of the corpus restiforme.

The symptoms are fully explained by the existence of this focus. Thus the sensory disturbance on the opposite side of the body is explained by the involvement of the long sensory tracts; the paralysis of deglutition, vocal cords and palate by the lesion of the nucleus of the vagus; the loss of corneal reflex and analgesia of the forehead on the left side by the involvement of the spinal root of the fifth cranial (trigeminal) nerve and of the substantia gelatinosa. The author agrees with the view expressed by Schlesinger in his work on syringomyelia that the most caudal portion of the substantia gelatinosa forms the center for the first or ophthalmic division of the trigeminus, particularly for the innervation of the forehead. The fact that

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(7) Deutsche Zeitschr. f. Nervenheilk., Vol. 40, p. 380.

tactile sensation was retained confirms Kohnstamm's view that the tactile fibers of the trigeminus terminate in the pons, while those conducting pain and temperature sense pass through the spinal root.

The occurrence of contraction of the pupil and narrowing of the palpebral fissure has frequently been met with in other cases of lesions of the medulla oblongata, including nearly all reported cases of thrombosis of the vertebral artery. The author favors Breuer's and Marburg's view that these phenomena are due to the existence of a sympathetic center governing the dilating fibers of the pupil in the dorso-medial portion of the substantia reticularis of the medulla oblongata. This view, however, is not generally accepted; for instance, Oppenheim in his text-book still favors the doctrine of a cilio-spinal center in the vicinity of the first dorsal root.

FAT EMBOLISM.

From the Pathologic Institute of the University of Christiania a large monograph on fat embolism by Nils Backer Gröndahl[8] has just appeared. He investigated carefully 108 cases in which the condition might be suspected, and the results bear out his introductory statement that it is one which is frequently overlooked and much neglected. Thus, practically all of 40 cases of fracture showed more or less fat embolism, the only exceptions being in cases of fracture of bones very poor in fatty marrow, such as the bones of the head and pelvis. The frequency of fatal fat embolism cannot be accurately determined. Of 1,026 cases of fracture from the records of the Norwegian Government Insurance Bureau 69 were fatal within 10 days. In not over 12 of these could fat embolism have been the cause of death. Hämig[9] found that of 377 fracture patients in Zürich 40 died, and 5 of these of fat embolism. Barrack found 3 deaths from fat embolism among 929 fracture patients at the Charité in Berlin.

While most cases follow fractures, fat embolism may

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(8) On Fettemboli. Kristiania, 1911; 228 pages.
(9) Beitr. z. klin. Chir., Vol. 27, p. 333.

occur after orthopedic operations. Thus, according to Vulpius, there were 2 deaths from fat embolism among 1,500 forcible repositions for club foot. Damage to the subcutaneous fat and internal organs, particularly the liver, is also an occasional cause. Curiously enough, the first case of fat embolism ever described, that of Zenker, was one of rupture of the liver with fat embolism of the lungs.

The cases naturally group themselves in two classes, those of pulmonary and those of cerebral fat embolism. While the pulmonary cases are better known, Gröndahl believes that the cerebral ones are nearly as frequent. He has personally observed 5 fatal cases of cerebral fat embolism. Case 1 was that of a man 21 years old, with a comminuted fracture of the leg. Eight hours later he became dull and forgetful and within 24 hours, completely comatose. There were no focal symptoms except slight rigidity of the left arm and shoulder. He died on the fourth day. At the necropsy both the cerebrum and cerebellum showed exceedingly numerous punctate hemorrhages, most numerous in the vicinity of the central ganglia. Microscopic examination of frozen sections stained with scarlet R showed abundant fat emboli in the brain and also in the lungs. The symptoms clearly pointed to the cerebral lesions as the cause of death. Both the gross and the microscopic appearances in this case were highly characteristic and due to the formation of minute anemic infarcts into which hemorrhage from neighboring capillaries occurred. Plate IV, A, shows the naked eye appearance of a portion of the frontal lobe in this case. Most of the hemorrhages are in the white matter. Plate IV, B, shows the microscopic appearance of the hemorrhages which are seen to surround small necrotic areas.

It is characteristic of all reported cases of fatal cerebral fat embolism that an interval of relative comfort exists between the injury and the onset of brain symptoms. The duration of this interval varies from a few hours to several days. In the author's 5 cases the interval ranged from one-half to twenty-four hours. Stupor, gradually becoming deep coma, is the principal symptom. Focal symptoms rarely occur. The pupillary and corneal reflexes are usually diminished or lost. Choked disc and other signs of increased intracranial pressure are generally missing. Cheyne-Stokes respiration is frequently present toward the end.

As to prophylaxis the author points out that manipulations of a fresh fracture, jolting by transporting the patient on a rough road, etc., should be avoided whenever possible. When cerebral symptoms once have appeared the prognosis is very grave and the author is favorably inclined toward the justification of the operation suggested by Wilms,[1] namely the establishment of a temporary fistula of the thoracic duct to diminish the further supply of fat. This operation was performed in one case by Wilms, and the patient recovered.

A Codivilla,[2] in discussing the cause of convulsions following orthopedic operations, states that they have been ascribed to fat embolism of the brain, particularly in an article by Schanz[3] who recommends the intravenous injection of physiologic salt solution to dilute the blood, increase blood-pressure and drive the fat particles through the capillaries. Codivilla, however, does not believe in the rôle of fat embolism in the etology of the convulsions, but thinks that they are reflex in nature, due to the reaction of the central nervous system to irritation of innumerable nerve-endings in the bruised or stretched soft parts.

Diseases of the Pons.

Topical Symptoms in Pontine Lesions are thoroughly analyzed by Marburg[4]

1. *Motor Disturbances.* Epileptiform convulsions occur both in cases of hemorrhage and of tumors of the pons, but they are not true focal symptoms, being produced indirectly either by increased intracranial pressure, rupture into the ventricle, or meningeal or other complications. Various authors have found convulsions in from 6 to 10 per cent. of cases of pontine tumors. Mar-

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(1) Sem. Méd., 1910, p. 138.
(2) Deutsche med. Wochenschr., 1910, No. 46.
(3) Zentralbl. f. Chir., 1910, p. 43.
(4) Deutsche Zeitschr. f. Nervenheilk., Vol. 41, p. 41.

burg does not believe that convulsions can be directly produced by a tumor of the pons, or that hemiplegia in such cases is produced in any other way than by involvement of the pyramidal fibers. Isolated paralysis of one extremity may occur while hemiplegia is quite frequent even in case of thrombosis of the basilar artery. In the latter case as well as in the case of pontine tumors, hemiplegia may gradually develop into paralysis of both legs. In spite of the small size and closeness of the two pyramidal tracts complete paralysis of the four extremities is uncommon.

2. *Affections of the Cranial Nerves.* Irritative phenomena, such as facial spasm and trismus, point to involvement of the roots of the respective cranial nerves, in this case, the seventh and fifth nerves, as it is uncertain whether lesions within the pons, affecting the nuclei, can produce such symptoms. Paralysis of these nerves in intrapontine lesions is common and gives rise to the typical alternating hemiplegia, the extremities being paralyzed on the side opposite the lesion, the facial muscles on the same side. In case of lesions involving the facial nucleus the facial paralysis usually is complete, involves all branches, and is associated with reaction of degeneration. Paralysis of the lower portion alone generally means a supranuclear lesion, but it is possible for nuclear partial paralysis to occur when only a portion of the nucleus is involved, as it is known that the dorsal part of the nucleus innervates the upper part of the face. Isolated paralysis of the external rectus occurs in 18 per cent. of tumors of the pons and points to a lesion at its caudal end where the sixth (abducens) nerve takes its origin. Conjugate deviation of the eyes is usually on the side opposite the lesion and to the side of the hemiplegia, but there is probably also a conjugate deviation due to lesion of the vestibular tract, including Deiters' nucleus which may be to the side of the lesion or to the opposite side according to whether it is due to irritation or paralysis.

3. *Disturbances of Sensation.* Careful study of sensation in cases of pontine and bulbar lesions has led Marburg to the following conclusions as to localization

in this region: Pain and temperature impulses from the opposite side, pass through the tractus spino-tectalis and tractus spino-thalamicus in such a manner that the pain fibers lie most mesially, the heat fibers most laterally and the cold fibers between them. This is true of the fibers to the extremities while those going to the neck and chest in the bulb and pons lie mesially to the tractus spino-tectalis. It has been shown clinically that the neck and chest may escape when sensation in the rest of the body is impaired, and that sensation in the neck and chest may be involved together with that in the head when the rest of the body escapes. Deep sensibility seems to be impaired when the internal arcuate fibers on the same side or the mesial lemniscus on the opposite side are involved. Loss of pain and temperature sense in the region supplied by the fifth (trigeminal) nerve points to a lesion of its spinal root, lesions of its caudal portion affecting the sensibility of the cornea, and more ventral lesions that of the mucous membranes of the nose, cheek and mouth. As to the cutaneous distribution, it appears that the fibers of the ophthalmic division come from the most caudal and most ventral portion of the root, those of the superior maxillary division from the middle portion, while those of the inferior maxillary division are represented in the entire root. This knowledge of the localization of fibers in the trigeminal root was gained chiefly through the investigation of cases of syringomyelia by V. Tölder.[1] As alternating hemiplegia is the characteristic motor disturbance in a pontine lesion, so an alternating sensory disturbance is equally characteristic, the trigeminal area of the side of the lesion being affected and pain and temperature sense on the opposite side of the body. If deep sensibility is also affected or if the heat sense or cold sense alone, or if the chest and neck region alone is involved, then a very exact localization may be possible.

Disturbances of the sense of taste do not as yet permit of fine localization. Deafness as a symptom of pontine lesions was discussed at length in the *Practical Medicine Series,* 1910, Vol. 10, p. 65. Marburg also

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(1) Jahrb. f. Psych., 1899, Vol. 18, p. 458.

points out that impairment of hearing occurs as a symptom of tegmental lesions affecting the trapezoid fibers.

4. *Sympathetic Disturbances.* Vasomotor, secretory and trophic disturbances in cases of pontobulbar lesions have been given considerable attention by French writers, notably Babinski, who described as "vaso-asymmetry" and "thermo-asymmetry," the phenomena consisting of lowered temperature (as much as one degree) and reduced vasomotor reaction on the side opposite the lesion. The capillary pulse is smaller and the vasoconstrictor reflex reduced on the colder side, which is also pale or livid. Hyperidrosis of the side opposite a gunshot wound of the bulb has been described. Trophic disturbances in the region of the trigeminal nerve may be due to lesions of its nucleus and spinal root. The topical importance of glycosuria which Chabral[2] found existed in 13 out of 65 cases of pontine and bulbar tumor, has not been determined. Sympathetic disturbance of the eye on the side of the lesion is fairly common especially in bulb lesions and consists of narrowed pupil, retracted eyeball, and ptosis. Marburg ascribes this to interruption of the tract which lies in the dorsal portion of the substantia reticularis in the vicinity of the dorsal vagus nucleus.

Lesions of Deiters' Nucleus. This group of cells, which is part of the nucleus of the vestibular portion of the eighth cranial nerve, plays an important rôle in connection with such symptoms as vertigo and nystagmus. Without a knowledge of the connections between the vestibular nuclei and those of the nerves supplying the external ocular muscles an understanding of the recent extensive work of Bárány, Bartels and others on nystagmus, as well as of the significance of a tendency to fall in a certain direction and to keep the eyes and head in a certain position in cases of brain lesions, is impossible. Fig. 4 from Emil Villiger's[3] recent work shows how these structures are connected by means of the posterior longitudinal bundle (fasciculus longitudinalis medialis) and the connection between the spinal cord and Deiters' nucleus by means of the tractus vestib-

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(2) L'Encéphale, 1908, p. 403.
(3) Gehirn und Rückenmark, 2nd Ed., Leipsic, 1910.

ulo-spinalis (antero-lateral ground bundle). It is assumed that by means of this same posterior longitudinal bundle, the connection between the 6th nerve (abducens) nucleus governing the external rectus and the 3d nerve (motor oculi) nucleus governing the opposite internal

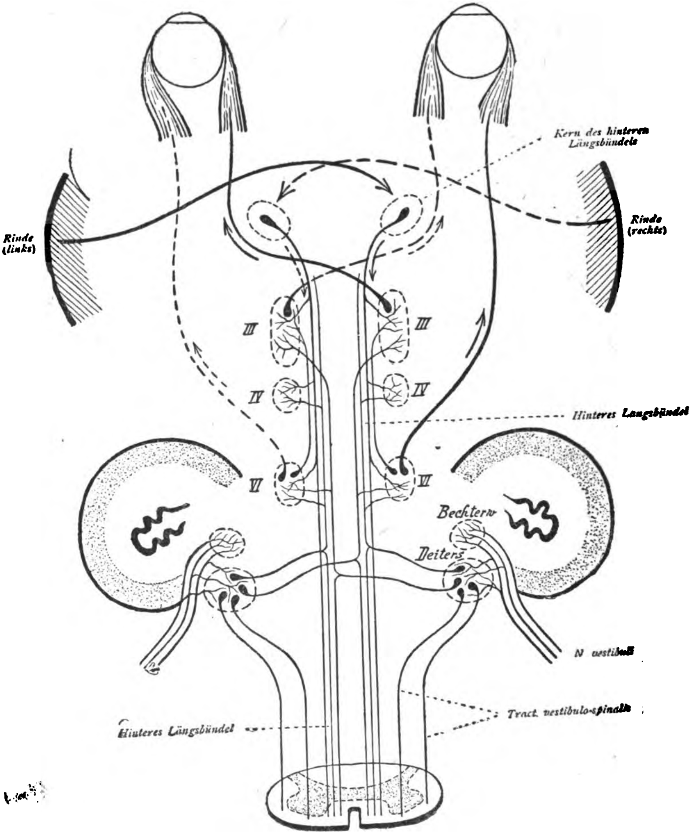

Fig. 4.

Connections between vestibular and ocular nerve nuclei.
Hinteres Längsbündel=Posterior longitudinal bundle.
III. Nucleus of 3rd nerve (motor oculi).
IV. Nucleus of 4th nerve (patheticus).
VI. Nucleus of 6th nerve (abducens).

rectus is made, and thus permits of conjugate movements of the eyes. The conjugate deviation of the eyes to the side of say a left-sided cerebral destructive lesion is seen to be due to the connection of the cortex with the cranial nerve nuclei of the right side which govern movements of the eyes to that side, while the normal right hemisphere through the nuclei of the left side causes unopposed rotation of the eyes to the left. A left-sided pontine lesion, on the other hand, involving the posterior longitudinal bundle, causes deviation to the right side by preventing action on the part of the nuclei of the left side.

According to Marburg[4] vestibular nystagmus occurring when the mechanical and caloric irritability of the labyrinth is destroyed means affection of Deiters' nucleus. In a case of auditory nerve tumor with total deafness and loss of reaction on the part of the labyrinth on that side, galvanization may produce nystagmus by stimulating Deiters' nucleus. In most cases he finds that the tendency to fall is to the side of the lesion, but there are many exceptions. The loss of tendon reflexes, transient or permanent, frequently described in cases of thrombosis of the vertebral artery, is ascribed by Marburg to a lesion of this nucleus which he believes dominates the "tonus" for the reflexes as well as for the labyrinth and ocular muscles. He attributes the loss of reflexes to the ventro-caudal portion of the nucleus, the nystagmus to a higher level, while a lesion of the most cephalic (superior) portion causes only vertigo or vertigo with conjugate deviation.

DISEASES OF THE CEREBELLUM.

The Vestibular Apparatus and the Cerebellum. Bárány[5] describes two methods of examination confined to the diagnosis of cerebellar diseases:

"The first of these methods investigates the equilibrium of the body, the second the movements of the extremities during vestibular irritation. The disorders

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(4) Deutsche Zeitschr. f. Nervenheilk., Vol. 41, p. 67.
(5) Brit. Med. Jour., Oct. 22, 1910.

of equilibrium are tested by Romberg's test—that is, the patient has to stand with closed eyes, and feet together—and we must first distinguish between (*a*) spontaneous disturbance of equilibrium, and (*b*) disturbance of equilibrium experimentally produced.

"(*a*) If a man has by any disease of the labyrinth a strong rotary nystagmus to the right, he will fall to the left on assuming the position for Romberg's test; that means he falls in the plane of the nystagmus, but opposite to the direction of the quick component of the nystagmus. If, maintaining the same position, only the head is turned 90° to the left, the patient falls backward; if the head is turned 90° to the right he falls forward. This is the law characteristic for the vestibular disorders of equilibrium which I have detected.

"(*b*) The experimental disturbance of equilibrium can be produced in every normal man by eliciting a vestibular nystagmus through turning or syringing. There is only to say that, just as the spontaneous disturbances of equilibrium with different people are of different strength, also the experimental one with normal individuals shows great personal differences. I have seen normal men with the strongest nystagmus stand without moving, and others with slight nystagmus fall like a tree. If we produce rotary nystagmus to the right by syringing the left ear with cold water, or by turning ten times to the left with the head bent 90° forward, the patient, on assuming the position for Romberg's test, will in falling follow the rules given under (*a*).

"In cases with cerebellar disease we observe spontaneous disturbance of equilibrium which, at first sight, is just the same as in vestibular disease. But there are very important differences if you examine exactly. In cerebellar disease there is: (1) no connection between the mostly present spontaneous nystagmus and the direction of the falling. The patient may have nystagmus to the right—after the rule above given—and should fall to the left, but he really falls to the right. (2) The influence of the position of the head upon the direction of the fall is absent. Change of position of the head does not change the direction of the fall.

"In the last year I have examined a great number of cases with cerebellar troubles, and I always tested also the experimental nystagmus and its influence upon the falling. I have found that very often syringing with cold water produced quite normal nystagmus, but the influence upon the falling was abnormal. If I syringed the left ear with cold water I got strong rotary nystagmus to the right, but nevertheless the patient did not fall to the left, but fell forward. Turning the head 90° to the left side did not make him fall backward, but he still fell forward. If I can produce a definitely abnormal reaction, I make the diagnosis that a disease of the vermis of the cerebellum is present. At the last meeting of the *Vienna Neurological Society* I was able to present the cerebellum of a patient where alone from this behavior I made the diagnosis of tumor of the vermis of the cerebellum, which was found in the dissection.

"How is the behavior of the cerebellar cases to be explained?

"To understand it, we first must understand the normal. We have heard that with a certain vestibular nystagmus falling in a certain direction is combined, when the head is erect in the ordinary position. When the head is turned, the nystagmus does not change, but the direction of fall changes—that is, other muscles of the trunk are innervated. What produces this change of innervation? It is surely not a vestibular irritation, elicited by the turning of the head, because the fall changes its direction just in the same way if the head remains quiet and the body is turned under the head. It can only be the irritation of the joints and muscles of the neck, caused by the turning of the head, which produces this change of falling. For this purpose the centripetal innervation arising from the neck muscles and joints must on some spot of the brain act together with the vestibular innervation."

Bárány considers it most probable that this interaction takes place in the cortex of the vermis of the cerebellum where the fibers of the cerebellar lateral tract and the fibers of the vestibular nerve come together.

Cerebral Syphilis.

Laboratory Tests in Syphilogenic Nervous Diseases. Nonne[6] has continued his thorough study of the "four reactions," *i. e.,* Wassermann test with the blood and spinal fluid, examination of the spinal fluid for cells, and for globulin by the ammonium sulphate test ("phase I test"). His previous experience with these tests was related in the *Practical Medicine Series,* 1910, Vol. 10, p. 67. His new series of cases, observed during the period between October 1, 1909, and April 30, 1911, comprise: 167 cases of tabes; 179 of paretic dementia; 97 cases of various forms of cerebrospinal syphilis; 68 cases of multiple sclerosis; 38 cases of brain tumor; 14 cases of tumor of the cord.

One of the new features touched upon by Nonne is dealt with at length in a separate article by his assistant Hauptmann,[7] who has extended the usefulness of the Wassermann test with the cerebrospinal fluid by employing increased amounts of fluid in making the test. The proportion of fluid is increased up to five times the usual amount. In this manner a much larger proportion of positive tests was obtained and the intensity of the reaction is measured by the amount of fluid necessary to obtain a positive test. Of 44 cases of cerebrospinal syphilis in which the fluid gave negative reactions with the ordinary method, 42 gave positive reactions by using larger quantities. The 2 negative cases were considered completely healed as there had been no new symptoms for several years, and the fluid also showed no increase in cells and proteids. A positive reaction with the spinal fluid was never obtained except in cases of actual syphilitic or parasyphilitic lesions of the nervous system. The test is therefore of great value in distinguishing between actual syphilitic changes in the central nervous system and simple arteriosclerosis

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(6) Deutsche Zeitschr. f. Nervenheilk., 1911, Vol. 42, p. 201.
(7) Ibid, p. 240.

in persons who have had syphilis. The latter may give a positive test with the blood serum, but they do not with the spinal fluid.

Nonne states that it is now universally agreed that in syphilitic and parasyphilitic nervous disease there is practically always more or less marked increase in cells in the spinal fluid (pleocytosis), and more marked in the parasyphilitic diseases (tabes and paretic dementia), than in genuine syphilis. But with a large material exceptions occur, as among the 167 cases of tabes, there were 11 in which all 4 tests were negative. Four of these cases were stationary, the others incipient. Of the genuine syphilitic diseases, negative tests are most frequent in cases of syphilitic arteritis of the brain. In non-syphilitic diseases, lymphocytosis and a positive globulin test may be present, but the reactions are usually of slight degree. This is true of brain tumor and multiple sclerosis, while in spinal cord tumor a strong globulin test is not uncommon. It must also be considered proven that occasionally moderate lymphocytosis of the spinal fluid may occur in syphilitic individuals whose nervous system is not diseased. A marked globulin reaction never occurs when the nervous system is not organically diseased.

As to the question of the specificity of the Wassermann reaction, Nonne states that it must now be considered settled that the test is not strictly specific as it is sometimes positive in certain tropical diseases, in malaria, and in certain stages of scarlet fever. There is only one non-syphilitic disease of practical importance to the neurologist in which a positive test in exceptional cases has been obtained with the blood serum and this is multiple sclerosis. Nonne had 5 such positive cases, 3 with necropsy, in all of which there was no evidence of syphilis. Nonne summarizes his present day opinion as follows:

1. *Examination of the Blood.* A positive Wassermann test is characteristic for syphilis. The exceptions are so rare and unimportant as to deserve little consideration: A positive test with the blood-serum indicates nothing further than that the person at one time has

been infected with syphilis, not that the present illness must be of syphilitic nature. A negative test is of value in excluding paretic dementia, as almost all cases of this disease react positively.

2. *Examination of the Spinal Fluid. Normal fluid* is under a pressure equal to 90 to 130 mm. of water. The "phase I" test is negative when there are not more than 5 or 6 cells per cubic mm. The Wassermann test is negative both by the original method, when 0.2 c.c. is used, and by the extended method when as much as 1 c.c is used. *Abnormal fluid* may show (1) increased pressure; (2) a positive "phase I" reaction and (3) increase in cells. These three findings, single or in combination, show the presence of organic disease of the central nervous system.

3. Whether this disease is of syphilitic nature or not may be decided by making the Wassermann test with the fluid. If this test is positive when the original 0.2 c.c. are used the case is probably one of paretic dementia or of tabo-paresis, as this amount of fluid seldom gives a positive test in pure tabes or cerebrospinal syphilis. In the great majority of cases of paretic dementia the test is positive with 0.2 c.c. of fluid. In nearly all cases of cerebrospinal syphilis and tabes, the test is not positive unless larger quantities are used (0.3 to 1 c.c.).

The typical findings in the principal forms of syphilogenic nervous disease are as follows:

I. *Paretic Dementia or Tabo-Paresis.*

1. Wassermann test with the blood positive in almost 100 per cent. Pressure of spinal fluid often increased.
2. "Phase I" test positive in 95 to 100 per cent.
3. Lymphocytosis present in about 95 per cent.
4. Wassermann test with spinal fluid:

(*a*) Positive in 85 to 90 per cent. by using the original method with 0.2 c.c. of fluid.

(*b*) Positive in 100 per cent. by using larger quantities.

II. *Tabes Dorsalis (Without Paretic Dementia).*

1. Wassermann test with the blood positive in 60 to 70 per cent. Pressure of spinal fluid often increased.

2. "Phase I" test positive in 90 to 95 per cent.
3. Lymphocytosis present in about 90 per cent.
4. Wassermann test with spinal fluid:

(*a*) Original method with 0.2 c.c., positive in 5 to 10 per cent.

(*b*) With larger quantities, positive in almost 100 per cent.

III. *Cerebrospinal Syphilis.*

1. Wassermann test with blood, positive in 80 to 90 per cent. Pressure of spinal fluid often increased.
2. "Phase I" test nearly always positive.
3. Lymphocytosis nearly always present.
4. Wassermann test with spinal fluid:

(*a*) Original method (0.2 c.c.), positive in about 10 per cent.

(*b*) With larger quantities, nearly always positive. (Of particular diagnostic value in reference to multiple sclerosis, brain tumor and spinal cord tumor.)

In order to show the practical value of these tests, even to experienced neurologists, Nonne gives numerous examples, classified in eleven groups in which clinical methods alone were insufficient to reach a diagnosis.

1. *Cases with Mild Mental Symptoms in Patients Who Gave a Positive History of Syphilis But no Signs of Organic Nervous Disease.* (7 cases). One of these in whom all four tests were positive had been treated a whole year for dementia precox, which disease was strongly suggested by the symptoms, but after a few months the pupils and tendon reflexes became abnormal and gradually the typical picture of paretic dementia developed. Another patient, a woman of 30 years of age, had syphilis at 14, and a few epileptic attacks at 17, and had been suffering from hallucinations and mental confusion for 2½ years. All 4 tests were negative. She was observed for 2 years afterward and no sign of paretic dementia developed. A man with stationary tabes developed attacks of headache and for 4 years had occasional epileptiform attacks. The Wassermann test with the blood was positive, the three other tests negative. No sign of paretic dementia developed during the next two years.

2. *Cases with a Positive History of Syphilis with Suspicious Mental and Somatic Symptoms but with Negative Tests and Non-Development of Paretic Dementia.* (3 cases.) One of these, a merchant 40 years old, who had syphilis 8 years previously, became depressed, irritable, slept poorly and showed decreased capacity for work. The pupils were unequal, the patellar reflexes and ankle-jerks difficult to obtain. All 4 tests were negative and the patient improved considerably during the next 1½ years.

3. *Cases in Which Paretic Dementia Was Diagnosticated Very Early by Means of Positive Tests.* (4 cases.) Example: A restaurant keeper addicted to alcohol, who had syphilis 8 years ago, became irritable and sleepless after some business trouble. There were no physical findings. All four tests were positive. The excitement subsided and the patient apparently recovered, but six months later he returned to the hospital with grandiose ideas and typical physical signs of paretic dementia.

4. *Isolated Pupillary Anomalies Without Mental Symptoms, with a History of Syphilis.* (5 cases.) One of these patients with all the reactions positive was apparently well 1¼ years afterward. Three others gave a negative Wassermann test with the spinal fluid but the other tests were positive, yet none developed new symptoms in from 1 to 2 years. Hence the results show that the presence of positive reactions in such cases need not indicate that symptoms of tabes or of paretic dementia must develop in the near future.

5. *Differential Diagnosis Between Paretic Dementia and Chronic Alcoholism in Syphilitic Subjects.* (10 cases.) Such cases are exceedingly difficult as all symptoms of paretic dementia, even the speech disturbance, may be simulated in alcoholics. For example: A man 50 years old, who had had syphilis 20 years previously and was a heavy drinker, came to the hospital with symptoms of Korsakow's psychosis following delirium tremens. The pupils were unequal and reacted sluggishly. The tendon reflexes were increased and there was tremor of the tongue and facial muscles. He had

several epileptiform attacks. The Wassermann test with the blood, and lymphocytosis, were positive, but the "phase " test and the Wassermann test with the spinal fluid were negative. The patient died of cirrhosis of the liver. Necropsy revealed chronic cerebral leptomeningitis, but there was no microscopic evidence of paretic dementia or of cerebral syphilis.

6. *Differential Diagnosis Between Cerebral Syphilis and Paretic Dementia.* (9 cases, 5 with necropsy.) In the necropsied cases with the Wassermann test negative in the spinal fluid there was cerebral syphilis, but not histologic evidence of paretic dementia.

7. *Differential Diagnosis Between Brain Tumor and Brain Syphilis.* (10 cases, 7 with necropsy.) For example: A man, 50 years old, developed symptoms of increased brain pressure. All four tests were negative, but there was marked improvement during a course of inunctions. After six weeks the patient suddenly died, and a gliosarcoma of the cerebellum was found. Again, a woman, 37 years old, suffered from headache, somnolence, mental deterioration and occasional confusions. The pupils were unequal, and failed to react to light. Speech was slurred. Later optic neuritis developed. The Wassermann test was positive in the blood, the other 3 reactions negative. Six weeks later sarcoma of the cerebellum was found at necropsy.

8. *Differential Diagnosis Between Syphilitic Endarteritis (Heubner's Form) and Ordinary Arteriosclerosis in a Syphilitic Individual.* The results are suggestive, but so far not confirmed by necropsy.

9. *Has Paretic Dementia Become Superadded in a Case of Tabes?* The occurrence of a strongly positive Wassermann test in the spinal fluid renders the existence of complicating paretic dementia very probable. A test recently described by Weil and Kafka (8) also may be of value here. These authors maintain that in paretic dementia the permeability of the meninges is increased so as to permit sheep's blood amboceptor, normally present in the blood, to appear in the spinal fluid as well where it normally does not occur. Nonne's assistant,

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(8) Wien. klin. Wochenschr., 1911, Nr. 10.

Hauptmann, obtained this test in two-thirds of the cases of paretic dementia examined. Of the controls all were negative except 2 cases in which the latter disease cannot be entirely excluded.

10. *Differentiation Between Syphilogenous and other Spinal Cord Diseases.* (11 cases.) For example: A waiter, 38 years old, without history of syphilis developed paralysis of the upper and lower extremities, and sphincter weakness after a fall on the back. Naturally hematomyelia was suspected. The Wassermann test in the blood and the spinal fluid test were positive, and the patient improved on treatment with salvarsan and mercury.

11. *Tabes and Paretic Dementia on the Basis of Hereditary Syphilis.* In these cases all four or some of the reactions are often absent. Thus, a woman, 30 years old, whose father was syphilitic and mother tabetic, and who had syphilitic disseminated choroiditis and all the typical signs of tabes, gave negative reactions with all four tests. However, there was no progression of the symptoms during six years of observation.

Future Tasks. Nonne looks forward to the further *quantitative* elaboration of the Wassermann test. Further, it must be settled whether in exceptional cases alcoholism (which Nonne denies) and multiple sclerosis may give a positive reaction in the blood. The serum test of Kafka and Weil also demands further study.

Cerebrospinal Syphilis with Fever and Presence of Spirochetes in the Brain and Cord. According to Strasmann[9] the case reported by him is the first one of acquired syphilis in which the *Spirocheta pallida* has been demonstrated in the brain and cord, and it is remarkable that the other organs, particularly the spleen and liver failed to show the organism. The patient, a man of 26 years, had a chancre in March, 1908, and was treated with inunctions. In June he had transient swellings of the right shoulder and elbow and the testicles, and in August swelling of the left arm and pain in various joints; in September he had iritis. All of

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(9) Deutsche Zeitschr. f. Nervenheilk., Vol. 40, p. 387.

these affections disappeared. Toward the end of December he became unsteady on his feet and on January 2, 1909, he was taken with severe pain in the small of the back and abdomen, followed on the next day by complete paralysis of both legs and retention of urine. A month later incontinence of urine set in and the patient became able to walk with help. Soon the legs grew worse and in July they again became completely paralyzed and vision began to fail.

When admitted to the hospital on September 3, 1910, examination revealed spastic paralysis of both legs with bilateral Babinski sign, iritis in the right eye, left Argyll-Robertson pupil and foci of choroiditis. The tactile sense was normal, but the pain and temperature sense were impaired in both lower extremities. The cerebrospinal fluid was rich in lymphocytes and gave a positive Nonne-Apelt globulin test. On November 17 he developed facial paralysis on the right side. He died on December 2. During the entire three months' stay in the hospital there was an irregular intermittent fever and occasional chills. A chart of the temperature during the last ten days shows that it several times rose to 101.5° F. Neither clinical examination nor a complete necropsy showed any cause for the fever outside of the syphilitic disease of the central nervous system. The anatomic diagnosis was: chronic diffuse syphilitic cerebrospinal meningitis and myelitis; arteritis of vessels at the base of the brain; bilateral fibrous orchitis; and passive hyperemia of viscera. The anatomic diagnosis was fully confirmed on histologic examination. Spirochetes were found in great abundance in the proliferated vessel walls throughout the meninges, brain and cord. They were also found in the inflamed sheath of the hypoglossal nerve at its exit from the medulla oblongata. The author concludes that the organisms follow the lymph-channels, particularly the perivascular ones. According to Strasmann spirochetes have been found previously in the central nervous system only in infants afflicted with congenital syphilis. Thus Ranke[1] found

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(1) Zeitsch. f. jugendl. Schwachsinn. Bd. 2.

the organisms in the brain and cord of 7 of 11 infants examined.

SALVARSAN IN AFFECTIONS OF THE NERVOUS SYSTEM.

No subject within the realm of neurology has been more volubly discussed during the past year than the effect of salvarsan for good and for evil upon the nervous system. The tendency seems to be for opposing opinions to converge in the view that the remedy is neither as curative nor as dangerous as first supposed. The early view that degenerations in the nervous system constituted a contra-indication has been abandoned, and it will be seen from the subsequent review of the literature that excellent results have often been obtained in cerebral and spinal syphilis, while in tabes and paretic dementia comparatively little benefit is reported.

A most animated discussion has arisen regarding the so-called "neuro-recidives," or "nerve recurrences," paralytic phenomena on the part of peripheral nerves, chiefly the cranial ones, occurring a few weeks or months after the use of the remedy. One set of observers, headed by Finger, believes in a direct toxic action of the remedy, while others, who are in the majority, claim that these symptoms are produced by syphilis itself as a result of tissue reaction. This is supported by the fact that the "recurrences" yield to treatment by mercury or more salvarsan and also by anatomic demonstration, particularly in Westphal's case, to be related subsequently.

Cases of Neuro-Recurrences. Finger[4] considers two possible explanations for the "neuro-recidives," namely: (1) direct neurotropic action of salvarsan or, (2) a combined effect in the sense that salvarsan creates *loci minores resistentiæ* in certain nerves in which the syphilitic disease then becomes localized. The first patient received 0.45 grams of salvarsan during the early secondary stage and two months later returned with severe headache, left optic neuritis and right oculomotor and facial paralysis. In spite of renewed salvarsan injection the condition grew worse and optic neuritis also appeared in the right eye. Ordinary syphilitic treatment

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(4) Berlin. klin. Wochenschr., 1911, p. 18.

also failed but ten weeks later the process began to regress leaving, however, partial disability. In the second case bilateral optic neuritis appeared 9 or 10 weeks after injection of 0.4 gram of salvarsan, and was not influenced by subsequent antisyphilitic treatment. Nine months later the urine still contained arsenic. In the third case optic neuritis also appeared and resisted antisyphilitic treatment. The author considers the subcutaneous and intramuscular injections dangerous and counsels their abandonment.

In reply to Finger, Benario,[5] supporting himself by the statements of Oppenheim and other authorities regarding the protean and frequently recurring symptoms of brain syphilis, maintains that the cranial nerve lesions reported were syphilitic and criticizes Finger for using the neutral suspension of the drug. He also points out the great rarity of optic neuritis in arsenical intoxication.

In a later paper based on 126 cases of nerve complications (*neuro-recidives*) among 14,000 patients treated, Benario points out that these complications are especially frequent in the early secondary stage and in cases of extragenital chancres, especially on the head, and in cases where papular eruptions occur. The complications are often preceded by severe headache, vertigo, tinnitus and trouble with the eyes. As treatment he recommends an intravenous injection of salvarsan followed by an intensive course of inunctions and then a second intravenous salvarsan injection.

Nonne,[6] who never observed any nerve complications in 129 cases treated by himself, considers them of syphilitic nature and not due to the toxic effect of the drug for the reasons that further salvarsan treatment is beneficial and because these symptoms never have been observed in non-syphilitic patients treated with the drug. Nonne himself gave salvarsan to 17 non-syphilitic patients. He is convinced that the fear of the toxic effect of salvarsan will not prevent its use any more than the demonstrated occasional occurrences of neuritis from mercury has prevented its use.

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(5) Berlin. klin. Wochenschr., 1911, No. 26.
(6) Neurol. Centralbl., 1911, p. 826.

Geronne and Gutmann[7] met with the following complications from 6 to 8 weeks after intravenous, subcutaneous or intramuscular salvarsan injections in 13 cases. 1. Irritative symptoms from the cerebral and spinal meninges. 2. Basal meningitis with paralysis of both facial nerves. 3. Basal meningitis with double facial paralysis and affection of both auditory nerves. 4. Bilateral otitis interna, right-sided optic neuritis and homonymous hemianopsia. 5. Facial paralysis. 6. Oculomotor paralysis. 7. Optic neuritis and meningeal irritation. 8 and 9. Left-sided otitis interna. 10 and 11. Bilateral otitis interna. 12. Otitis interna, chiefly an affection of the vestibular nerve. 13. Otitis interna with Menière's syndrome. Twelve of these patients were in the early secondary stage. The authors do not ascribe any of these affections to arsenical intoxication but all of them come within the scope of common syphilitic affections, and most of them were cured or improved by renewed salvarsan treatment with or without mercury. They suggest that the complications possibly may be avoided by instituting mercurial treatment immediately after the injection of salvarsan.

Rille[8] treated 200 patients with salvarsan, and 40 of these remained under constant observation. Cranial nerve complications occurred in 3 cases, affecting the facial and auditory nerves; in one case there was also optic neuritis and paralysis of the trochlear nerve. The symptoms disappeared rapidly on treatment with mercury.

The Auditory Nerve Lesions following salvarsan injection have received much attention. Thus O. Beck[9] reports 4 cases of affection of the vestibular branch. In one case the symptoms (severe vertigo and disturbance of equilibrium, marked nystagmus to the non-affected side, hearing intact) appeared three hours after an injection, in another three days after injection. As the affection is transient the author does not consider it a contra-indication.

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(7) Berlin. klin. Wochenschr., 1911, No. 11.
(8) Berlin. klin. Wochenschr., 1910, No. 50.
(9) Med. Klin., 1910, No. 50.

Mayer,[1] on the basis of 65 cases of syphilitic ear affections observed at the otologic clinic in Graz, states that symptoms may appear three weeks after the chancre, and usually commence with tinnitus and vertigo. However, isolated affection of the vestibular nerve was not observed, and the author is inclined to ascribe its occurrence following salvarsan injections to the action of the drug. Otherwise he could not account for the large number of such cases recently reported. In fact, the rarity of isolated vestibular disease in syphilis has been so great that its existence has been questioned. The author also recalls that in Ehrlich's experiments with another organic arsenic preparation, arsacetin, degeneration in the vestibular nerve occurred.

Eye Affections as Indications or Contra-Indications for the Use of Salvarsan. O. Stuelp [2] has made a valuable compilation and sifting of reported material up to February, 1911, and finds 470 cases which can be used to determine the value of this remedy in syphilitic affections of the eye and the possible contra-indications to its use from danger to the eyes. In the first place, this author cannot find a single convincing case of blindness due to salvarsan. He rejects the well-known case of single optic atrophy reported by Finger as during the year preceding the salvarsan injection 30 arsacetin and 69 enesol injections had been given. That arsacetin and atoxyl may cause optic atrophy is well known. The effect of arsenical preparations on the optic nerve was discussed in the *Practical Medicine Series,* 1910, Vol. X, p. 161. However, Stuelp finds an ominously long list of reported cases in which two or three months after salvarsan injection there appeared eye lesions common in tertiary syphilis, such as iritis, optic neuritis, ocular palsies, choroiditis, while the other syphilitic manifestations had disappeared.

Two cases of C. Stern [3] of syphilophobic, but probably not syphilitic patients, are very suggestive. Although the Wassermann test was negative they insisted on injections and both developed ocular palsies. [This

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(1) Wien. klin. Wochenschr., 1911, No. 11.
(2) Klin. Monatsbl. f. Augenheilk., March, 1911.
(3) Deutsche med. Wochenschr., 1910, Nos. 41 and 49.

contradicts Nonne's statement made on page 101.—Ed.] In tabes and paretic dementia the author only recommends the drug when there still is suspicion of "active syphilitic morbid products," and is very skeptical as to the favorable reports in the literature.

G. Tobias[4] is among those who maintain that inasmuch as most of the eye symptoms following salvarsan injections resemble those common in syphilis rather than those of arsenical poisoning, they are to be looked upon as genuine syphilitic recurrences, due to rapid multiplication of living spirochetes, which perhaps in some instances had been continued in encapsulated foci, and were set free by the softening of these foci brought about by the salvarsan.

Flemming,[5] of Berlin, on the basis of 180 cases of syphilis of the eye treated with salvarsan, expresses the following opinion: "To sum up, we can say that in '606' we have an effective treatment for syphilitic disease of the eyes in which a rapid result is essential or when the cases have failed to respond to mercurial or iodin treatment. It cannot be looked upon, at least not in eye diseases, as a panacea for all cases of syphilis which will supplant our present specific therapeutic agents for that disease. The ill effects attributed to the treatment by some could not be borne out by this report. Such adverse conditions as were observed are to be accredited to the lues itself rather than to the new treatment."

The Cranial Nerve Complications Following Salvarsan Injections (Neuro-Recidives.) This forms the subject of an article by Alfred Saenger[6] of Hamburg. Wechselmann was the first to call attention to them and explain them as being due to foci of spirochetes which had escaped destruction. Many others, notably Benario, support this view. Saenger over 20 years ago called attention to the frequent affection of the cranial nerves early in syphilis and now raises the question whether such cranial nerve paralyses really are more frequent after salvarsan treatment. He concludes that such pa-

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(4) Klin. Monatsbl. f. Augenheilk., January, 1911.
(5) Archives of Ophthalmol., May, 1911.
(6) Neurol. Centralbl., 1911, p. 796.

ralyses have been more frequently noted because the cases treated with salvarsan have been more closely watched. At the St. Georg Hospital in Hamburg 1,000 syphilitic patients were given salvarsan and 3 developed peripheral nerve disturbances, in one case in the ulnar nerve, in a second in the communicans peronei, while the third patient had retrobulbar neuritis. In the nervous department of St. Georg's Hospital and in that of the Eppendorf Hospital under the care of Nonne no *neuro-recidives* have been observed, in Saenger's opinion, because the cases are largely metasyphilitic or in a late tertiary stage.

As stated, strong evidence in favor of the exclusive syphilitic etiology of these cranial nerve complications lies in the fact that the nerves affected are those commonly affected by syphilis. That this is also true of the auditory nerve has been pointed out by the well-known otologist Urbantschitsch[7] and confirmed by v. Zeissl[8] and others.

Ehrlich[9] has pointed out that especially those portions of the cranial nerves contained within narrow bony canals are prone to harbor spirochetes which escape the action of the drug and these give rise to future symptoms. It is also true that these symptoms appear particularly in cases treated with single and too-small doses.

Fatal Cases. *Death Following Salvarsan Treatment in a Case of Tabes and Chronic Syphilitic Meningitis.* A. Westphal[1] reports the following case which is of great value in clearing up the question whether certain acute nerve affections arising after the administration of the remedy are due to the remedy itself or to the syphilitic disease. A very nervous and irritable, but not demented woman, suffering from tabes and atrophy of the hand muscles, was given 0.4 gram of salvarsan into the gluteal muscles. Seven hours later sudden difficulty in breathing with signs of paralysis of the diaphragm appeared. She died in a few hours. Pre-

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(7) Wien. klin. Wochenschr., 1910, No. 48.
(8) Wien. klin. Rundschau, 1911, No. 18.
(9) Berlin. klin. Wochenschr., 1910, No. 51.
(1) Berlin. klin. Wochenschr., May 11, 1911.

viously there had never been any difficulty with respiration. At the necropsy the heart was found to be small, otherwise normal. The aorta showed syphilitic sclerosis, and the lungs were edematous. The brain showed no gross change except moderate thickening of the pia at the base. In the upper part of the cord the pia was also thickened, and there was marked grey degeneration of the posterior columns. Histologic examination in addition showed areas of round-celled infiltration in the pia of the cervical and upper thoracic region which in places formed actual miliary gummata, involving many of the anterior roots, particularly those of the third and fourth cervical nerves which go to form the phrenic nerve. This explains both the muscular atrophy of the hands, caused by the affection of the roots going to the brachial plexus, and the paralysis of the diaphragm, supplied by the phrenic nerve. The case was clearly one of the rare ones of combination of tabes with chronic syphilitic meningitis.

The case is of great value as a clear demonstration that the reaction on the part of tissue affected with latent syphilitic inflammation following salvarsan injection may cause acute nerve manifestations which easily may be wrongly attributed to direct toxic action of the drug itself.

Westphal advises beginning with small doses in all cases where there is reason to suspect syphilitic disease of the upper part of the cervical cord, particularly when nerves of such vital importance as the phrenic or pneumogastric may be involved. However, he considers it justifiable to employ salvarsan in such cases, especially when they do not respond to mercury and potassium iodid.

A fatal case following intramuscular salvarsan injection in paretic dementia is reported by A. Jörgensen[2]. Two days after the injection, fever, marked pallor and albuminuria appeared. The patient died in a few days and the necropsy disclosed slight parenchymatous changes in the organs, especially the kidneys, and de-

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(2) Med. Klin., 1911, No. 10.

generation of some fibers of the pneumogastric nerve and the nerves of the right brachial plexus. The author considers that death was due to acute arsenical poisoning.

Therapeutic Results. H. Vogt,[3] of Frankfurt, on the basis of a large material, finds that the best results are obtained in direct syphilitic and particularly early cases such as syphilitic meningitis, especially the spinal form, meningomyelitis and many cases of syphilitic endarteritis. He finds, on the whole, similar results with intramuscular and intravenous, single or repeated injections. However, he has reached the conclusion that, especially in chronic cases of syphilis of the nervous system, it is preferable to give repeated injections of small doses. He first gives a "test injection" of 0.1 gram and later repeated injections of 0.1 to 0.3 grams in the course of several months. In this way he finds that equally good results are obtained, and the danger of severe reaction in important localities of the nervous system (as in Westphal's case already described) may be avoided. Much stress must be laid on the technic, particularly the preparation of the remedy. Such a detail as the use of nothing but absolutely sterilized water for the solution, both in his and Ehrlich's opinion accounts for the fact that much less severe local reactions are obtained in the large clinics where hundreds of cases are treated and the technic has been thoroughly perfected.

As to tabes and paretic dementia, Vogt maintains that, while the prospects are not good, the question is not yet settled as the results have been quite varied. In the last-named disease the early enthusiastic expectations have not been fulfilled, but numerous observers have noted improvement, especially in the early stages. In tabes, improvement is obtained in a comparatively small number of cases.

The radicular symptoms were particuarly benefited in Vogt's experience which coincides with that of others. The most favorable cases are those with varying symptoms attributable to proliferations about the roots rather

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(3) Neurol. Centralbl., 1911, p. 787.

than to degenerations within the cord, such as cases of shifting pains, ocular disturbances and ataxia, while cases with pronounced sensory disturbance are less favorable.

Vogt considers as *contra-indications* to the use of salvarsan the existence of organic or functional disturbance of the heart; severe disease of the vessels, respiratory organs or kidneys. Fever also is a contra-indication. Furthermore, it is very questionable whether the remedy should be used in the presence of extensive softening or degeneration in the nervous system, such as advanced tabes. Cases of suspected general arteriosclerosis of the brain, of syphilitic or of non-syphilitic origin, as well as cases of congenital syphilis call for great caution.

Voight's restrictions in tabes are clearly drawn. In the first place he excludes the fulminant cases occurring a short time after infection and in which the symptoms appear in rapid succession. Then cases which have lasted for many years, perhaps with many remissions, but in which the tabes came on comparatively soon after the infection, in four to six years, are unfavorable. Very advanced cases are to be excluded whether the disease commenced early in relation to the syphilis, or late. Prominent bladder and sensory disturbances also call for caution. On the other hand, changes in the eye-grounds are not contra-indications.

Th. Schmitt[5] saw little good result from salvarsan in tabes. Of 14 cases of paretic dementia only 3 appeared benefited. But in cerebral syphilis he had some wonderful results. Thus, one man previously very stupid cleared up mentally in four days, the sluggish pupils again reacted promptly, and the paralytic handwriting became normal in ten days. Headache and severe supra-orbital pain in other cases cleared up in a few days. He gives the drug intravenously, first 0.1 gram, then in 5 hours 0.5 gram, to guard against the anaphylactic reaction. [Similarly it has been recommended to give a small amount of antimeningitic serum intravenously shortly before a full intraspinal dose.—Ed.]

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(5) Münch. med. Wochenschr., 1911, No. 16.

Brain Tumor.

Operative Versus Expectant Treatment in Diseases of the Nervous System is the title of a paper read before the Society of German Neurologists by Sir Victor Horsley,[7] and is entirely devoted to brain tumor. He takes a decided and radical stand in favor of operation in every case in which a diagnosis of brain tumor has been made. If possible, the tumor should be removed, but at any rate decompression should be provided for. He prefers operating in two stages. Extirpation is to be replaced by a merely decompressive operation only when the tumor cannot be safely removed, or when it cannot be localized. The decompression opening should be as close to the tumor as possible. If the Wassermann test is negative antisyphilitic treatment should not be allowed to delay operation more than six weeks. If there is no decided improvement operation should be performed; merely a slight improvement does not suffice. Even in cases of gummata or syphilitic pachymeningitis mercurial treatment in the ordinary way is often insufficient, and Horsley then favors trephining and washing out the subdural space with 1 to 1,000 sublimate solution.

In the discussion Oppenheim took issue with Horsley on some points, and particularly opposed operating in cases of known syphilis. He also called attention to the fact that cases of non-suppurative encephalitis and serous meningitis for a time may completely simulate the picture of tumor and yet end in perfect recovery. [Circumscribed serous meningitis simulating brain tumor is discussed at length in the *Practical Medicine Series,* 1910, Vol. 10, pp. 55-60.—Ed.]

Aside from his numerous published cases of this kind Oppenheim has seen about a dozen others of which the following is an example: A woman, 30 years old was seen in October, 1906, when she had been ill for six months with headache, vomiting, stupor, and disturbed vision. There were double choked disc, diplopia, slight

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(7) Deutsche Zeitschr. f. Nervheilk., 41, p. 91; also Neurol. Centralbl., 1910, No. 21.

cerebellar ataxia, tenderness on percussion of the right temporal region and other less definite symptoms, the whole picture strongly suggesting tumor of uncertain localization, most likely in the cerebellum or right temporal lobe. Syphilis could be excluded, and there had been no improvement on mercury and potassic iodid. But serous meningitis could not be excluded, and as the woman also was pregnant operation was postponed. When again seen in February, 1907, she was much better and recovered completely in the course of the year.

Oppenheim also hesitates very much about operating in cases of cortical epilepsy with spasms of the right side of the face as the operation on the corresponding area on the left side of the brain is likely to produce aphasia. He has, on the whole, seen little good come from the surgical treatment of epilepsy except in cases of traumatic cortical epilepsy or tumor. He cannot recall a single case of cerebral birth-palsy cured by operation. On the other hand he is very optimistic about the results of spinal cord surgery, in which the danger of doing harm is also much less.

Schüller, of Vienna, contributed to the discussion by suggesting a new palliative operation in certain cases of brain tumor, namely drainage of the hydrocephalus through the nose by opening the sella turcica. This is an imitation of nature's own way, as nasal cerebral fistula sometimes becomes established in cases of hydrocephalus (hydrorrhea nasalis).

The Danger of Lumbar Puncture in Cases of Brain Tumor is probably never great when only a few cubic centimeters of fluid are removed at a time. When larger quantities are withdrawn, especially in a case of tumor in the posterior fossa, death from sudden paralysis of the bulbar centers has been known to occur, probably from impaction of the medulla oblongata in the foramen magnum. This is due to the sudden withdrawal of the support of the fluid in the spinal canal, while the intracranial pressure remains at its original abnormal height, as the medulla presumably already had gradually descended so as to prevent sufficiently rapid equalization of pressure above and below the foramen.

That the medulla oblongata descends into the foramen magnum in cases of brain tumor or hydrocephalus where no lumbar puncture has been performed has often been demonstrated at necropsy. In cases of spina bifida where the intraspinal pressure is nil, downward displacement of both medulla and cerebellum is of frequent occurrence.

W. W. Hamburger[8] reports a case of brain tumor with intense headache and choked disc as indications of increased intracranial pressure. In the hope of relieving the headache and of throwing some light on the diagnosis, lumbar puncture was performed and 14 c.c. of clear fluid withdrawn. It was not under increased pressure. Eight hours later the patient grew more restless. The pulse became rapid, weak and intermittent and the heart stopped 37 hours after the puncture. At the necropsy the medulla and a surrounding fringe of cerebellum were found moulded and wedged into the foramen magnum. Tumor nodules were found both at the base and within the brain, and the ventricles were considerably dilated. There evidently had been a high intracranial pressure while the descent of the medulla oblongata had prevented the high pressure from being communicated to the fluid within the spinal canal. On account of the distinct tissue moulding it is inconceivable that the descent could have taken place after the puncture but the puncture probably caused an increase in the descent. The author mentions the suggestion made by Curschman[9] of immediately reinjecting a sterile solution into the spinal canal to cause counter-pressure. He also quotes Schlesinger's[1] statement that he has seen fatalities following lumbar puncture, but believes the procedure is safe if the fluid is allowed to escape very slowly.

Quincke,[2] the father of lumbar puncture, on the basis of 45 personal cases does not agree with those who warn against the use of this procedure in cases of suspected tumor in the posterior fossa. It is only necessary to

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(8) Surg., Gyn. and Obstet., December, 1910.
(9) Deutsche med. Wochenschr., 1910, p. 1798.
(1) Ibid., 1910, p. 1977.
(2) Deutsche Zeitschr. f. Nervenheilk., Vol. 40, p. 95.

withdraw the fluid very slowly. He has often seen relief of symptoms in cerebellar tumor from repeated cautious punctures. In 26 of his 45 cases the diagnosis was verified by necropsy, and in 10 the cerebellum was the site of the tumor. The pressure varied from 90 to 900 mm. of water with an average of 330 mm. (normal, 80 to 120 mm.) and was not at all proportionate to the volume of the tumor. The latter often excites secretion of fluid and in certain localities causes interference with the circulation of the fluid. The amount of albumens was generally normal, that is less than ½ *pro mille*. In 4 cases there was a marked increase in albumen up to 15 *pro mille*.

Two of these cases came to necropsy and one was found to be glioma of the cerebellum, the other glioma of the precentral convolution. Lymphocytosis was present in only 2 cases. In one case lumbar puncture and puncture of the lateral ventricle were made simultaneously. The pressure by the former registered 260 mm. and by the latter 350 mm. Necropsy revealed cystic glioma of the superior vermis of the cerebellum extending into the fourth ventricle, and displacement of the cerebellar tonsil into the foramen magnum. The marked difference in pressure was ascribed to this displacement, but the blocking of the foramen magnum was not complete, as 12 c.c. of fluid escaped by the lumbar puncture.

Another case of death from lumbar puncture is that of Th. Schwartz,[3] of a cerebello-pontine angle tumor, a neurofibroma of the auditory nerve. This patient gave a positive Wassermann test, but his cerebral disease was independent of his syphilis, an interesting observation in view of Oppenheim's statement that he knows of no case on record of the symptom-complex of cerebello-pontine angle having been caused by syphilis. [See *Practical Medicine Series,* 1910, Vol. X, p. 99.]

Exophthalmos and Brain Tumor. T. H. Weisenburg[4] reports 8 cases of brain tumor in which exophthalmos occurred.

Case 1 was a vascular glioma of the lateral and third ventricles compressing one optic thalamus. There was

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(3) St. Petersburg. med. Wochenschr., 1911, No. 1.
(4) Jour. Amer. Med. Assoc., Dec. 3, 1910.

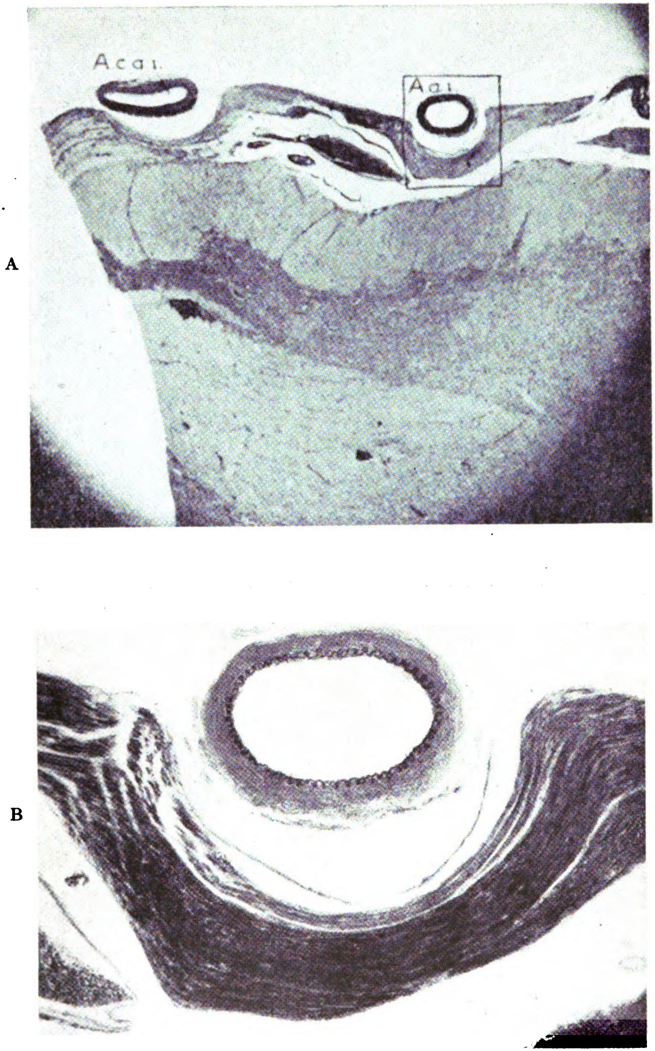

PLATE V.

Indentation of abducens nerve by anterior inferior cerebellar artery (a. c. a. i.) and internal auditory artery (a. a. i.). B is an enlargement of square seen in A.—Cushing. (Page 115.)

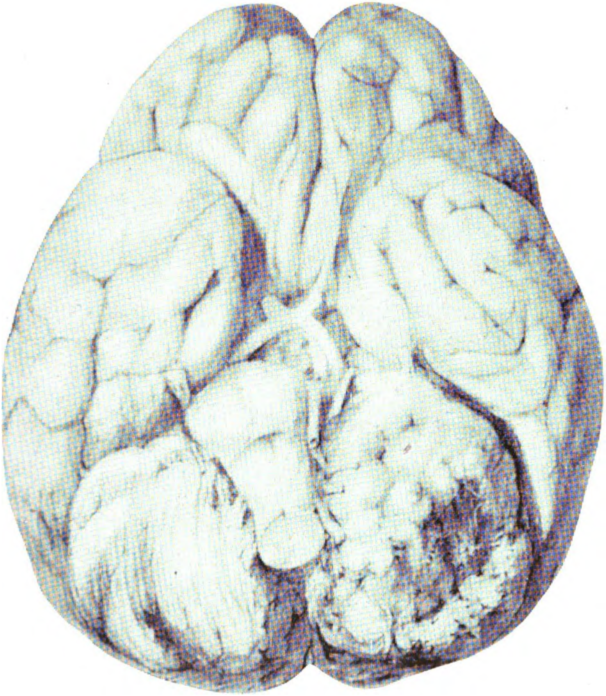

PLATE VI.

Glioma of cerebellum.—Grinker. (Page 118.)

bilateral exophthalmos and as the tumor compressed the choroid plexus, velum interpositum and the veins of Galen it is probable that it caused a stasis in the cavernous sinus. Case 2 was one of glioma of the third ventricle with mild exophthalmos. Cases 3 and 4 were clinically diagnosed as tumors of the third ventricle, the former with unilateral, the latter with bilateral exophthalmos. Case 5 was clinically diagnosed as glioma of the pons and peduncle and there was bilateral exophthalmos. Case 6 was a glioma involving the posterior part of the medulla, pons and cerebral peduncle. A decompressive operation over the right side of the cerebellum had been performed but nothing was found, and right-sided exophthalmos gradually developed after the operation. There was no metastasis in the orbit. Case 7 was a large basal tumor in the posterior cranial fossa. Bilateral exophthalmos developed early in the case. Case 8. Sarcoma compressing the temporal lobe, optic chiasm and posterior orbital bones. Eight months after an injury to the right orbit, bulging of the right eye appeared and progressed gradually. There was no ocular palsy and no general symptoms of brain tumor were present, but eight years after the onset of exophthalmos the patient developed general convulsions and had a temporary left-sided hemiplegia. She died soon afterward and the necropsy revealed an orange-sized sarcoma in the middle cranial fossa. Although the evidence, even on careful dissection, was not clear it was thought that the exophthalmos was caused by pressure on the cavernous sinus.

The author states that he has records of 75 cases of brain tumor and that exophthalmos occurred only in the 8 cases mentioned. He formulates the following conclusions:

1. Exophthalmos accompanies brain tumor more frequently than is generally supposed.
2. It occurs only in those cases in which there is great intracranial pressure, especially when there is in addition direct interference with the normal flow of the cerebrospinal fluid.

3. Exophthalmos is produced by direct pressure on the cavernous sinus.

4. Its presence is of some clinical value inasmuch as unilateral exophthalmos is nearly always indicative of an intracranial lesion on the same side.

5. In those cases in which the protrusion is bilateral there is nearly always a greater exophthalmos on the side of the greater intracranial pressure or lesion.

Distortions of the Visual Fields in Brain Tumor. Cushing and Heuer,[5] on the basis of personal observations of a very large material, reach the following conclusions:

"Out of the 123 cases in our tumor series in which perimetric observations could be made, 53 showed simple color-interlacing or inversion with more or less constriction of the field boundaries.

"In 10 of these 53 cases the dyschromatopsia either actually preceded any recognizable ophthalmoscopic change in the eye-grounds or accompanied most incipient stages of choked disc. These distortions of the color boundaries, therefore, promise to be of some service in the making of a more precocious diagnosis of an increase of intracranial tension than is commonly ventured on. Thus, in a number of cases of early tumor extirpation, color inversion and interlacing, in addition to attacks of Jacksonian epilepsy, were the only clinical indications of the lesion.

"We have attempted to correlate the perimetric deviations, observed before and after operation, in the remaining 42 cases of simple dyschromatopsia, with the accompanying grades of choked disk subdivided into six groups according to Marcus Gunn's classification.

"Until the perception for colors is completely lost, inversion or interlacing is often apparent, even in the greatly constricted color peripheries characterizing the advanced stages of choked disk.

"Though permanent achromatopsia is usual, total loss of vision is by no means inevitable even when the process has advanced into Gunn's fifth stage."

Strangulation of the Abducens Nerves by Lateral

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(5) Jour. Amer. Med. Assoc., July 15, 1911.

Branches of the Basilar Artery in Cases of Brain Tumor. An elaborate study with this title, by Harvey Cushing[6] led to the following conclusions:

"The usual conjectures offered in explanation of the common occurrence of an internal squint in cases of brain tumor are not entirely satisfactory, and the view is submitted that in certain cases the condition may be due to strangulation by transverse branches of the basilar artery.

"This view is supported by the findings (1) that the arteries, contrary to the usual anatomical description, generally overlie the nerves; (2) that in a series of brains of tumor cases the vessels which normally encircle the brain-stem often produce a more or less deep grooving of the nervous tissues; (3) that the abducentes in many of these cases are deeply constricted; and (4) that a large percentage of the clinical histories of cases which show post-mortem a pontine grooving, with accompanying implication of the nerves, record either subjective diplopia or the actual presence of a convergent squint observed during life."

It has long been observed that paralysis of this nerve causing internal strabismus is very common in cases of tumor in different parts of the brain and the usual explanation has been that these nerves, on account of their long course and exposed position, are apt to be compressed against the base of the skull. Thus Collier[7] found ocular palsies constituting "false localizing signs" in 12.5 per cent. of 161 cases of brain tumor. He found that this "indirect" paralysis affected the abducens more than any other cranial nerve, and that it was involved in 12 of his cases of tumors situated above the tentorium. He submitted as an explanation the fact that these nerves are the only cranial nerves which pursue a longitudinal rather than an oblique or transverse course from their superficial origin in the brain-stem to their dural formina of exit. On this basis the shifting backward of the brain-stem so frequently observed, and sometimes even leading to distinct incarceration of the bulb and part of the cerebellum in the foramen

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(6) Brain, 1910, Vol. 33, p. 204.
(7) Brain, 1904, Vol. 27, p. 490.

magnum, would exert greater traction upon nerves directed antero-posteriorly than upon those having a transverse course. Cushing, however, finds that "even this ingenious hypothesis of Collier's does not give entire satisfaction for, granting the downward dislocation of the brain-stem which is inevitable with any considerable increase of supratentorial pressure, it is nevertheless difficult to see, in view of the near proximity of their points of external origin, how this traction from dislocation could paralyze the abducens on one side alone without an extreme degree of lateral deformation of the pons. It is difficult, too, to reconcile this explanation of a palsy produced by the gradual traction to which the nerves would be subjected under these circumstances with the well-recognized fact that motor nerves may undergo an astonishing degree of stretching and elongation without any observable interruption of function. This is particularly well seen in cases of cerebello-pontine tumor in which there may not be the slightest evidence of weakness of the facial muscles unless the condition is far advanced, and yet post-mortem the seventh nerve may be found wrapped around the circumference of the tumor, flattened and drawn out to more than twice its normal length. The same thing may be seen in the case of the third and sixth nerves which, much elongated and flattened, may similarly encircle a slowly-enlarging infundibular tumor without any profound disturbance of ocular movements. Peripheral motor nerves therefore do not seem readily to lose their power of transmitting impulses when subjected to a slow process of elongation, such as would be occasioned by even the direct action of a new growth. We shall learn, too, from the study of our own cases that in the absence of any direct affection of the nerves themselves or of their centers a subtentorial (cerebellar) lesion which actually pushes the pons forward with an effect, consequently, on the sixth pair, may nevertheless lead with even greater likelihood to a palsy of these nerves."

Cushing bases his conclusions on the observation of 40 brains obtained post-mortem from patients operated for brain tumor. The brains were always hardened *in situ* by carotid injections of formalin so that the normal configuration of the parts was absolutely preserved. An equal number of brains from various other intracranial lesions was also studied. The most striking feature in several of these cases was the deep "grooving," particularly of the pons, produced by arteries. Extensive tables of all cases showing this condition are given together with a lengthy analysis and numerous illustrations. The effect of the pressure of the artery on the nerve is seen in Plate V.

Tumors of the Third Ventricle. T. H. Weisenburg[8] reports 3 cases and analyzes all the cases reported by others in the effort to establish a symptom-complex. Internal hydrocephalus is nearly always produced on account of pressure on the choroid plexus and interference with the flow of the fluid from the lateral ventricles.

"The more direct group of symptoms which result from lesions of the third ventricle depend upon pressure on the surrounding structures. The third ventricle is surrounded on either side by the optic thalami, inferiorly by the optic chiasma and pituitary body and superiorly by the velum interpositum which transmits the veins of Galen. Its outlets are the foramina of Munro and the aqueduct of Sylvius. When there is encroachment upon its space, the increase in pressure which results is transmitted along the lines of least resistance to the other cavities through the foramina of Munro and aqueduct of Sylvius rather than to the structures which offer solid resistance, such as the thalamus."

After a complete analysis of the cases the author reaches the following conclusions:

1. Tumors within the third ventricle growing either from the ependymal walls or the choroid plexus are uncommon; 30 cases with necropsy have been reported altogether.
2. Their nature varies and has no direct bearing on the symptoms.
3. Tumors within the third ventricle have a tendency to grow in the direction of the flow of the cerebrospinal

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(8) Brain, 1910, Vol. 33, p. 236.

fluid, that is, toward the fourth ventricle through the aqueduct of Sylvius.

4. Internal hydrocephalus nearly always occurs either because of interference with the flow of the fluid or the function of the choroid plexus.

5. Growths within the third ventricle do not cause specific symptoms, and their recognition depends entirely upon the symptoms of pressure on the surrounding structures. Three divisions can be made:

a. Tumors of moderate size limited to the third ventricle presenting the symptoms of internal hydrocephalus with the addition that there is nearly always paresis of the limbs of one or both sides and possibly affection of the thalamus.

b. Tumors so situated as to obstruct the foramina of Munro cause dilatation of the lateral ventricles, and their position can be changed by deviation of the head, producing variation in the symptoms.

c. Tumors which attack the parts surrounding the aqueduct of Sylvius either by direct pressure or after extension into the aqueduct by growth of the tumor ventrally cause the following symptoms: Paralysis of associated ocular movement and of convergence upwards and, less commonly, to either side and downwards; ataxia of the cerebellar type, as shown in the gait, station or voluntary movements of the limbs; at times ptosis of the upper lids and protrusion of either one or both eye-balls; generally large pupils with impaired reactions; paresis of the limbs of one or both sides either with increased, normal or diminished reflexes and the general symptoms of tumor, as headache, choked disc, nausea, vomiting, and vertigo.

6. Lesions of the third ventricle do not cause specific mental symptoms; the occurrence of mental symptoms is dependent upon the compression of the cortex against the skull resulting from internal hydrocephalus.

Three Cases of Tumor in the Cerebello-Pontine Angle are reported by Julius Grinker.[9] Case 1 is of particular interest because the patient, a man 24 years old, was operated upon by three different surgeons in the

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(9) Jour. Amer. Med. Assoc., Dec. 3, 1910.

course of two months, each exposing the same brain area, but the first two failed to discover the tumor. In August, 1905, he felt weakness in the left leg and a little later in the left arm. In September, headache and transient attacks of dizziness appeared. Soon vision began to fail and the gait became staggering with a tendency to fall to the left. When examined in December, 1905, there were choked disc and beginning atrophy, slight nystagmoid jerkings when the eyes were directed in extreme lateral positions, slight weakness of the left half of the body and left-sided nerve deafness. Two months later the left corneal reflex was absent and the left trigeminal area analgesic. Soon afterward the first surgeon trephined over the left side of the cerebellum, but on discovering the presence of pulsation and no tumor, he replaced the bone and closed the wound. One week later the same surgeon attempted a ventricular tapping but found no fluid. Two weeks afterward the second surgeon also trephined over the left side of the cerebellum, and after an unsuccessful search in the region of the angle, he made a decompressive opening in the right temporal region. Meanwhile the patient had become completely blind and Dr. Grinker discouraged further operation. Nevertheless a third surgeon was called and uncovered the left side of the cerebellum again, explored the angle thoroughly and found a tumor, only part of which could be removed and which was pronounced a neurofibroma originating from the left auditory nerve. The patient was now relieved of his headache and dizziness, but the other symptoms became more pronounced. In September, 1909, severe headaches reappeared and resisted all forms of medication. A cautiously performed lumbar puncture, however, with removal of a small quantity of fluid gave complete relief for a time.

In December, 1909, the patient had a peculiar attack in which he fell backward, became unconscious and died within 2 hours. Examination of the brain revealed a tumor mass which occupied the entire left hemisphere of the cerebellum. The histologic picture was complicated, but in all probability the tumor was a glioma.[1] Plate VI.

In commenting on the case the author calls attention to the unusual initial feature of weakness in the arm and leg on the side of the tumor, a weakness which was unattended by spasticity or pathologic reflexes (no Babinski sign but the deep reflexes were markedly exaggerated, more so on the left side), and which the author believes to correspond to the asthenia of Luciani.

In the second case the first symptom was a peculiar heaviness and feeling of pressure, with an occasional sharp pain in the left cheek. When first examined there was complete left-sided nerve deafness and diminished sensation over the entire left half of the body. The optic discs and the reflexes were normal with the exception of some reduction of the conjunctival and corneal reflexes on the left side. A diagnosis of hysteria was first made, but six weeks later there was bilateral choked disc and headache, vertigo, vomiting and ataxia of the cerebellar type had appeared, making a diagnosis of tumor in the cerebello-pontine angle obvious. The diagnosis was verified by operation but the patient died and necropsy was refused. [The fact that impairment of the left corneal reflex was one of the first symptoms present emphasizes the importance of this reflex, as dwelt upon in the *Practical Medicine Series,* 1910, Vol. X, p. 9.—Ed.]

In Case 3 the diagnosis was also verified by operation but the patient died of facial erysipelas a few days later.

DISEASES OF THE HYPOPHYSIS.

A Successfully Operated Case of Cyst of the Hypophysis is reported by Bychowski.[2] The symptoms which led to an early diagnosis were amenorrhea, adiposity, optic atrophy, bitemporal hemianopsia, and distortion of the sella turcica revealed by the x-ray. The cyst contained brown fluid, and histologic examination

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(1) The specimens were presented to the *Chicago Pathological Society* and the consensus of opinion was in favor of glioma. See report in Trans. Chicago Pathological Society, Vol. 8, p. 44.

(2) Deutsche med. Wochenschr., 1910, No. 36.

of its wall showed no sign of malignancy. The operation was performed by von Eiselsberg. The dura mater was accidentally exposed and a meningitis resulted from which the patient recovered. Vision improved. The patient menstruated once two months after the operation. The previous apathy and depression disappeared, and eight months later the patient was in good condition but had not menstruated again.

Hyperplasia of the Hypophysis in Multiple Sclerosis was noted in 2 cases by Lhermitte.[3] The organ weighed 0.8 gram in one case, 1 gram in the other, and the hyperplasia affected the glandular lobe, both its "eosinophile" and "cyanophile" cells. This feature, showing that the disease may produce lesions outside of the cerebrospinal axis, confirms the author in his view of the toxic-infectious origin of this disease.

One of the patients had been subject to attacks of narcolepsy, a condition which has been frequently observed in cases of hyperplasia of the hypophysis, and the author believes that in at least a certain proportion of cases of narcolepsy a hypophysis lesion is the etiologic factor.

Acromegaly from Fright. Pel,[4] of Amsterdam, has observed 3 cases in which he believes that this disease developed as the result of fright. One of these was reported twenty years ago. The first new case is that of a married woman, 25 years old, who was in good health until August, 1906, when she was greatly frightened by an explosion of gas. The menstruation which was due four days later did not appear for nine months. She then menstruated two or three times, following which there was complete cessation. During the following year there was a gradual enlargement of the face, hands and feet leading to the typical appearance of acromegaly. There was no visual disturbance but *x*-ray examination showed the sella Turcica to be enlarged to four times its normal size.

The second case was that of a woman, 47 years old, who was admitted to the hospital in July, 1908, with general

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(3) Rev. Neurologique, Dec. 30, 1910.
(4) Berlin. klin. Wochenschr., Mar. 20, 1911.

weakness, headache, attacks of unconsciousness, disturbance of vision and enlargement of the face, hands and feet. At the age of 31 years, when she was six months pregnant, she was greatly frightened by a fire in the house, but the nervous state lasted only a day. The childbirth was normal, but menstruation never returned and the symptoms mentioned soon appeared. At the time of writing the findings were typical, including enlargement of the sella Turcica and optic atrophy.

The author is convinced that the rôle of the fright sustained as an etiologic factor in these cases should be admitted, especially as fright is frequently important in the production of exophthalmic goitre and diabetes in both of which diseases we are dealing with disturbed internal secretions as is the case in acromegaly. The author points out the interesting feature that cessation of menstruation was an early symptom in these cases, and if this is considered of hypophyseal origin then the time elapsing between the fright and the onset of the disease was shorter than would appear from the onset of the acromegalic features proper.

A Case of Acromegaly in a Child is reported clinically by G. Matassaru.[5] A boy of 9½ years, presented characteristic enlargement of the extremities and the tongue. The *x*-ray showed enlargement of the sella Turcica and a certain transparency of the bones to the *x*-ray. The thyroid was small and the skin of a myxedematous appearance. The blood examination showed 6,500,000 red and 8,500 white cells.

DISEASES OF THE SPINAL CORD.

Tumors of the Cord.

Spinal Cord Tumors. An exceedingly complete study with report of 22 cases is contributed by E. Flatau.[6] Among these were:

1. Tumors of the vertebræ. Of cases of this kind reported in the literature, operation resulted in recovery or marked improvement in 13.6 per cent. The author

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(5) Bucarest Thesis, 1910.
(6) Nouv. Icon. de la Salp., 1910, Vol. 23, p. 47, 313 and 457.

says that we should not hesitate to operate when the patient's general condition is good, when the number of vertebræ involved is small and where there are no extensive metastases. Cutting of the posterior roots to relieve pain has also been resorted to.

2. Extra-vertebral tumors which have grown into the spinal canal. The cases reported were: A. Sarcoma of mediastinum which penetrated the spinal canal at the third and sixth right thoracic intervertebral foramina. B. Probable lymphosarcoma of the neck with almost complete paralysis of the four extremities. C. Probable lymphosarcoma beneath the right clavicle. D. Sarcoma between the ninth and eleventh ribs with extension into the spinal canal and penetration of the dura. E. Sarcoma of the neck invading the cervical spine and surrounding the cord. In this class of cases, surgical treatment is rarely indicated, but a few successful cases have been reported such as Boener's patient with fibroma of the neck growing through the intervertebral foramen and causing spastic paralysis of the legs, who was able to walk six weeks after the operation; and Sick's case of enchondroma of the left fifth, sixth and seventh ribs with invasion of the vertebræ and compression of the cord; and Szekres' case of echinococcus of the back with compression of the cord.

3. Intravertebral tumors. Nine cases are reported in detail, and the symptoms and diagnosis are extensively dwelt upon.

Extramedullary Spinal Cord Glioma is the startling title of a case report by Inglis, Klingman, and Ballin,[8] but they hasten to admit its apparent incorrectness and explain that the tumor was entirely outside the cord and was attached only by a small pedicle to the subpial glia mantle and to the seventh posterior thoracic root. The case was one with the usual history of onset with neuralgic pain at the level of the lesion, followed by gradual sensory and motor impairment below that level and increased reflexes in the legs.

Among the five points which led to a correct localization was presence of the epigastric (upper abdominal)

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(8) N. Y. Med. Jour., Nov. 19, 1910.

reflexes on both sides while the lower abdominal and cremasteric reflexes were absent. The patient located his pain in the seventh intercostal space, and the left rectus abdominis muscle was paralyzed, while the right one contracted firmly when the patient attempted to rise from the recumbent position. [It is not stated whether the umbilicus was pulled upward when this attempt was made, which very likely was the case as the lower portion of the rectus probably was weaker than the upper portion. This displacement of the umbilicus away from the paralyzed portion of the rectus which is supplied by numerous cord segments is often of localizing value, and as attention was principally directed to it by the late Chas. E. Beevor, it has become known as the "Beevor sign."—Ed.]

The tumor, which was oval and measured 29x16 mm. was readily removed and proved to be a true glioma. The patient made a rapid recovery. Motion, sensation, and reflexes became normal, and when last observed fifteen months after the operation the patient was in full charge of his business. The authors, however, fear a recurrence within the cord. They have not discovered an analogous case in the literature.

Surgical Treatment. Up to the end of 1908 Flatau found records of 136 operated cases in the literature. Of 96 cases of intra- and extradural tumor collected by Stürsberg 21 involved the cervical region, 57 the thoracic region and 18 the lumbosacral region. Of 49 patients successfully operated upon, 39 recovered completely or nearly so and 10 others were benefited; 42 of the unsuccessful cases died following the operation. Three were not improved and information is lacking in 2 cases. Tumors in the thoracic region were most favorable. Successful removal has been accomplished of tumors situated as high up in the cord as the third cervical segment.

Flatau does not believe in the advantages of operating in two stages. He recommends the use of the electric trephine. It is well to remove a number of vertebral arches before opening the dura, as localization is often

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(9) Nouv. Icon. de la Salp., 1910, Vol. 23, p. 47, 313 and 457.

faulty by several segments on account of edema above the tumor. It is erroneous to suppose that the spinal column is weakened to any extent by the removal of even six or seven arches. Absence of pulsation of the dura usually indicates tumor but this is not always so, as in the absence of tumor the dura may bulge into the opening so as to prevent pulsation and in a few cases of medullary tumor weak pulsation of the dura has been noted. It is of the greatest importance to place the patient in the Trendelenburg position with the head lowered as much as possible before opening the dura. By doing so the pulse and respiration are not affected even at the moment when the fluid first escapes. The author advises not to remove the overlying dura with the tumor as adhesions are thus better avoided and as mere curetting of the inner surface of the dura suffices to prevent recurrence, which at any rate is rare even in the case of sarcoma. He urges operation not only in the certain cases of tumor but whenever there is reason to suspect tumor.

The restitution of functions on the part of the cord after removal of tumors compressing it is remarkably prompt even if the cord has been almost flattened out. Pain and sphincteric disturbances usually disappear rapidly and sensation is restored before motion. Of the sensory disturbances, impairment of the pressure sense (bathyanesthesia) is most persistent. Flatau's case 21 is remarkable in the rapid return of function. The patient was a woman, 40 years old, whose symptoms appeared nine months before operation with pain in the left leg, and three days later in the right leg. Soon walking became impossible and contractures developed as well as disturbance of the sphincters. There were severe pains in the left lower extremity and the left side of the trunk. Later the left hand became weak. The left palpebral fissure and pupil became narrowed. The reflexes in the legs were increased and ankle-clonus and the Babinski sign were present. Tactile sense was diminished below the third intercostal space, and pain and temperature sense in the same region and in the right arm.

At the operation, the arches of the sixth and seventh cervical and the three upper thoracic vertebræ were removed, and a spindle-celled sarcoma was dissected away from the inner surface of the dura at the level of the eighth cervical and first thoracic segments. The following day, sensation was improved in the left leg and the right foot. Two days later, the patient could move the right foot and knee slightly, and a month after the operation she could walk. Five months after the operation no trace of paralysis was left. Oppenheim has also observed improvement in sensation with partial return of motion and sphincter control on the first day after operation. Another of Oppenheim's patients was a perfect dancer four years after removal of a spinal tumor.

Death after operation may be the result of faulty technic, infection or of causes not clearly understood. Excessive loss of spinal fluid may cause death. Hemorrhage into the bulb has been noted. Sometimes vomiting sets in followed by great distension of the abdomen, weak pulse and death.

Intradural Spinal Cyst Successfully Removed. Chas. S. Potts[1] relates the case of a man, 42 years old, who had been well prior to his present illness aside from a blow on the right side over the tenth, eleventh and twelfth ribs eight years before the onset which was in 1907 with paroxysmal pain in the left lumbar region and unsteady gait. When examined in December, 1909, the abdominal reflex was absent on both sides, the cremasteric absent on the right side, while the knee reflexes were much increased, and the ankle reflexes present but without clonus. Babinski's toe-sign was present on the right side. Both testicles were completely insensitive to either pressure or blows; and there was ataxia of the legs and loss of appreciation of passive movements of the toes, but there was no definite loss of cutaneous sensibility anywhere. There was no loss of muscular strength and the sexual power was normal.

Laminectomy was performed by Deaver, the seventh, eighth, ninth and tenth thoracic laminæ being removed.

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(1) Jour. of Nerv. and Ment. Disease, October, 1910.

Under the dura on the posterior surface of the cord was a soft, gelatinous mass of yellowish color about 1½ inches long and ¾ inch broad which involved the eleventh and twelfth thoracic and first lumbar segments. It was readily removed and proved to be a cyst. The patient rapidly recovered, even the sensibility of the testicles becoming normal in a few weeks. The most interesting feature in the case is the testicular analgesia, and Potts is led to conclude that the spinal centers for testicular sensibility are contained in the eleventh and twelfth thoracic and first lumbar segments of the cord, the two former probably receiving their impressions through their sympathetic connections. Head, in his work on the relation of areas of peripheral pain and tenderness to visceral disease, associated the testicle with the tenth thoracic segment, having found in a case of contusion of one testicle cutaneous tenderness in the distribution of the tenth thoracic segment, which disappeared when the testicle was removed.

MULTIPLE SCLEROSIS.

The "Cobra Test." This reaction, discovered by Much and Holzmann, which depends on an increased power of the patient's serum to inhibit the hemolytic action of cobra venom, was discussed in the *Practical Medicine Series,* 1910, Vol. X, p. 232, in connection with its application to the differential diagnosis between dementia precox and manic-depressive insanity, the power being more frequently increased, *i. e.,* the reaction "positive," in the former. Nonne and Holzmann[2] have made this test in a large number of cases of all kinds of nervous and mental diseases and found it more frequently positive in multiple sclerosis than in any other condition, namely in 30 of 46 cases or 68 per cent. Seven were doubtful and 9 negative. Of 25 cases of tabes, 7 or 28 per cent. were positive.

A Case of Multiple Sclerosis Simulating Syringomyelia is reported by Z. Reich.[3] The patient, who first came under observation in 1902, had complained of

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(2) Deutsche Zeitschr. f. Nervenheilk., Vol. 41, p. 123.
(3) Wien. med. Wochenschr., July 29, 1911.

stiffness in the left foot for five years. There had been occasional paresthesias, slight incontinence of the urine and weakness of extension and abduction of the fingers of the right hand. At that time examination of sensation showed nothing abnormal except slightly diminished stereognostic sense. The pupils were unequal. In 1904 there was slight muscular atrophy in the upper extremities, and the temperature sense was impaired on the dorsum of the feet. The patellar and ankle-jerks were increased, and the Babinski sign was present on the right side. In 1907, bilateral ankle-clonus appeared, and the sense of position was impaired. The atrophy in the upper extremities became marked and the temperature sense became more affected. In May, 1910, the pupils, which previously had reacted to light, showed the Argyll-Robertson sign. The patient died in July, 1910.

The necropsy disclosed pulmonary and intestinal tuberculosis and multiple sclerosis of the brain and cord. On account of the marked muscular atrophy of the upper extremity and spastic weakness of the lower extremities, together with dissociation of sensation, syringomyelia had been suspected clinically. Multiple sclerosis was considered improbable on account of the absence of all cerebral symptoms and of the so-called cardinal symptoms (nystagmus, scanning speech and intention tremor). The occurrence of muscular atrophy in multiple sclerosis has been reported in a number of cases which have been analyzed by Lejonne.[4] Unlike syringomyelia, in multiple sclerosis the extensors of the fingers are affected by the atrophy before the flexors. The Argyll-Robertson pupil also has been previously described in a few cases of multiple sclerosis without evidence of syphilis.

Multiple Sclerosis and Combined Degeneration Simulating Tumor Compressing the Cord. Nonne[5] has for some years observed cases of multiple sclerosis and of combined cord degeneration in which the differential diagnosis from tumor could be made only by exploratory laminectomy. He points out that while ordinarily pain

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(4) Revue Neurologique, 1906, p. 176.
(5) Deutsche med. Wochenschr., Sept. 15, 1910.

is not a feature of the two diseases mentioned, recent observations, particularly by Eduard Müller, have shown that pain is more frequent than is generally supposed. (See *Practical Medicine Series,* 1910, Vol. 10, p. 118.) Similarly, many observers, among them Oppenheim, have described cases of tumors compressing the cord in which pain never occurred. In the last five years Nonne has expressed himself in favor of exploratory operation in doubtful cases.

His first case reported in the present paper is that of a woman, 59 years old, who for two years occasionally had suffered from pain in the back, especially between the shoulder-blades and paresthesias of the lower extremities. Gradually the legs became weak and showed a tendency to muscular cramps. For a few months there was a transient weakness of the bladder, and later paresthesias in the left ulnar nerve area appeared. There were no eye symptoms at any time and ophthalmoscopic examination was negative. At times there was tenderness on pressure from the seventh cervical to the second thoracic spine. The tendon reflexes in the legs were increased, with ankle-clonus and a positive Babinski sign. There was slight anesthesia below the knees and a partly anesthetic zone on the left half of the body from the level of the breast to the costal margin. The epigastric reflex was absent on both sides while the lower abdominal reflexes were weak. There was slight muscular atrophy in the ulnar region of the left hand.

The symptoms naturally pointed to tumor in the lower cervical region but the sensory disturbance was unusually slight. The age of the patient, the localized tenderness of the spine and the total absence of eye symptoms spoke against multiple sclerosis. Exploratory operation in the region indicated failed to reveal any tumor. In the course of the next two years the weakness of the legs advanced to a complete spastic paralysis, and the arms gradually became weak, with increased reflexes. The bladder disturbance reappeared, but the disturbances of sensation remained slight and variable.

Ocular symptoms never appeared. Necropsy revealed typical multiple sclerosis.

SPINAL MUSCULAR ATROPHY.

A Case of Spinal Muscular Atrophy Following Trauma is reported by M. Astwazaturow.[6] That this disease, which is closely related to amyotrophic lateral sclerosis, may develop subsequently to an injury was first pointed out by Erb. The present case was that of a laborer 62 years old who, at the age of 46 years, fell 30 feet, alighting on his feet. He recovered in a few days except for the persistence of pain along the spinal column. Shortly afterward he sustained a severe injury to the right arm. Then, very gradually the arms, especially the right one, grew weak. Five years later he developed melancholia, and was admitted to an institution. It was noted that there was considerable atrophy of the muscles of the right shoulder-girdle and arm. The infra- and supraspinatus, biceps and palmaris longus were most involved. The left arm was similarly, but less severely affected. The intercostal muscles were affected on both sides and the serratus on the left side. There was beginning paralysis and atrophy of the tongue. The disease progressed slowly and two years later the muscles of the pelvis and thighs became involved, and there were subjective sensory disturbances in the form of paresthesias and coldness of the lower extremities, and girdle-sensation.

Eight years later he had a second depressive attack, and now the atrophy had spread to the muscles of the back and calves and both sides of the face. He died during this attack. The chief post-mortem finding was marked reduction in number of the anterior horn cells and of the corresponding cells of the nuclei of the motor cranial nerves of the medulla and pons. There was also slight degeneration of the posterior columns.

Since Erb's original communication, similar cases have been described by several authors, so the possibility of a traumatic etiology of this obscure disease must be

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(6) Deutsche Zeitschr. f. Nervenheilk., 1911, Vol. 42, p. 353.

admitted and borne in mind in connection with medicolegal cases.

Progressive Spinal Muscular Atrophy as a Manifestation of Syphilis has been described from time to time especially by Raymond, Léri, and other French observers. Recently Baudouin and Bourgignon[7] presented to the *Paris Neurological Society* a man of 39 years of age, who, in the course of two years developed atrophy of the hands and arms of the Aran-Duchenne type, and atrophy of the anterior leg muscles, with reaction of degeneration. The ankle-jerks were normal a few months after the onset, but disappeared later. The knee-jerks persisted. There was a history of syphilis but the spinal fluid showed no lymphocytosis. There was no pain or other sensory disturbance.

In the discussion Léri expressed the opinion, based on over 30 cases examined by himself and others, that syphilis is responsible for a large number of cases of so-called chronic anterior poliomyelitis with muscular atrophy of the Aran-Duchenne type. The essential lesion is syphilitic meningomyelitis which affects the vessels of the cord in such a manner as to lead to destruction of cells in the anterior horns. Three clinical symptoms serve to render syphilitic etiology probable: Pain preceding and accompanying the atrophy; muscular weakness preceding the atrophy; and a rapid course. When, as may be the case, there are Argyll-Robertson pupils and lymphocytosis of the spinal fluid, syphilis becomes still more a certainty.

AMYOTROPHIC LATERAL SCLEROSIS.

Trauma as an Etiologic Factor has long been discussed, and Oppenheim in his text-book relates that he has observed the symptoms to appear immediately after a severe fright following which the patient was compelled to row with all his might. The frequency with which the question comes up in connection with accident insurance and employer's liability has led Gelma and Stroeklin[8] to review the subject, and they found a

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(7) Revue Neurologique, Nov. 30, 1910.
(8) Gaz. des Hôp., Mar. 23, 1911.

fairly large number of cases reported and add a new one.

The symptoms generally appear five to eight months after the injury, and are frequently first evident in the injured parts. Fatigue following the trauma is also considered of importance. Their own case was that of a man, 59 years old, a stone-worker, who injured his back and right leg during heavy lifting in September, 1907. He soon returned to work but had to quit ten months later on account of pain and weakness in the right leg. September, 1909, he could no longer walk and in February, 1910, the arms became affected and swallowing became difficult. Examination revealed atrophy of the small hand muscles and of those of the legs, with fibrillary twitchings. The patellar and ankle-jerks were increased, the latter with clonus. Sensation and the cerebrospinal fluid were normal. Speech was nasal and slow and deglutition difficult, but there was no atrophy of the tongue. The patient was unable to whistle. The reaction of degeneration was present in some of the paralyzed hand muscles. In addition, there were two symptoms foreign to the ordinary picture of this disease, namely incontinence of feces (but not of urine) and pain and tenderness of the back. [The latter possibly may have been due to a superadded traumatic neurosis, but the former casts some doubt on an otherwise apparently obvious diagnosis. Syphilis was denied but naturally cannot be positively excluded.—Ed.]

TABES DORSALIS.

Curious Romberg Sign in a Totally Blind Tabetic Negro. F. X. Dercum[9] presented to the *Philadelphia Neurological Society,* a tabetic negro, who had been blind for ten years. His gait was distinctly ataxic. When standing with his feet together and eyes open he swayed considerably but was able to maintain his station without the use of his cane. The moment he closed his eyes, however, the ataxia was suddenly increased, so that he would fall unless supported.

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(9) Jour. Nerv. and Ment. Disease, May, 1911.

Dercum has never before observed this phenomenon in a blind tabetic and suggests two possible explanations. The first one is that mere closure of the eyelids, though incapable of influencing the lost vision, gives rise to a subjective sense—a psychic sense—of uncertainty, and in this way greatly increases the inco-ordination. The other possible explanation is that the patient holds the levators of the lids rather tense which leads to a reinforcement, directly or indirectly, of centers concerned in co-ordination. He is inclined to reject the first explanation because the man makes no gestures with his hands as if to save himself from falling and his face betrays no change in expression.

Muscular Atrophy in Tabes. This subject was discussed at some length in the *Practical Medicine Series,* 1910, Vol. X, p. 126. Here the different views held as to the cause of the atrophy are mentioned, including that of S. A. K. Wilson, who attributes the condition to atrophy of anterior horn cells caused directly by the syphilis. Recently this author[1] has written an exhaustive paper on the subject, with a detailed and profusely illustrated pathologic report of two cases. He classifies the muscular atrophies in tabes under three heads:

1. General muscular wasting or emaciation, more particularly in the lower extremities.
2. Wasting of a frankly radicular or peripheral type. This is quite common and easily recognizable. The muscles supplied by the spinal accessory nerve, or one of the main arm or leg nerves, or the laryngeal muscles, may be involved.
3. The type of atrophy which begins in the small hand muscles and proceeds bilaterally and more or less symetrically after the fashion of a progressive muscular atrophy. The two cases reported belong to the third class.

Case I. A man, 47 years of age, who had had syphilis at 25, had suffered from difficulty in micturition for fourteen years, been subject to lightning pains for ten years and girdle-pains for nine years. Wasting of the small hand muscles had been present for seven years

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(1) Review of Neurol. and Psychiat., August, 1911.

commencing in the right hand and soon spreading to the left. (See Plates VII and VIII.) On examination he presented typical signs of tabes, such as Argyll-Robertson pupil, absence of the deep reflexes, loss of the deep sensibility, and incipient Charcot joint. In addition, there was extreme atrophy of the thenar and hypothenar eminences of both sides, the muscles of which had lost both galvanic and faradic excitability. There was also weakness of the anterior tibial group of both sides. The wasting gradually progressed to the interossei and the muscles of the forearms, particularly the extensors.

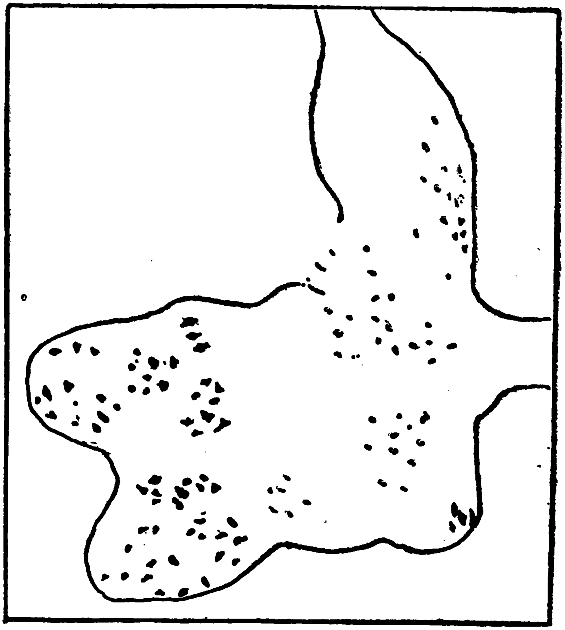

Fig. 5.
Showing the relative number of anterior horn cells in a normal case. Compare with Fig. 5a.

The findings at the necropsy and subsequent exceedingly thorough histologic examination are thus summarized: "In a typical case of advanced tabes dorsalis, with profound wasting of the upper extremities, especially of the hands, of the Aran-Duchenne type, the affected muscles are found to present only interstitial changes, evidently of secondary origin; the peripheral nerves also revealed changes chiefly of the nature of a chronic interstitial neuritis; while the motor cells of the anterior horns are of grossly atrophic type where they have not vanished entirely. The affection of the anterior horn cells is noticeable throughout the whole cord, but its incidence is greatest where the centers for the wasted muscles are located, *i. e.*, in the lower part of the cervical enlargement. (Figs. 5, 5a and 6.) In the lumbosacral cord the cells are relatively better preserved, and where this is the case it is noteworthy that more or

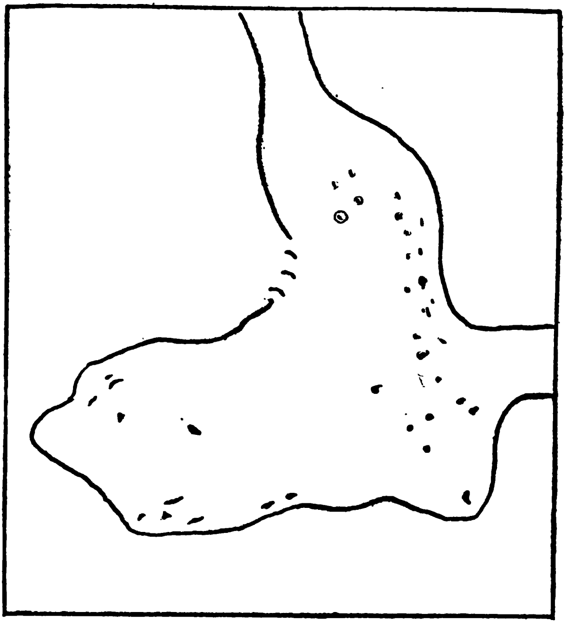

Fig. 5a.
Showing the relative number of anterior horn cells in a case of tabes with muscular atrophy. Compare with the normal case shown in Fig. 5.

less normal and atrophic cells may lie in the closest juxtaposition.”

The conclusion is reached that the muscular atrophy is due to primary atrophy of the anterior horn cells produced by the action of the syphilitic toxin. The author shows very conclusively that in these two cases the atrophy of the anterior horn cells can not be due to vascular changes or to the accompanying meningomyelitis. The latter is the most frequent cause of localized muscular atrophy in ordinary spinal cord syphilis.

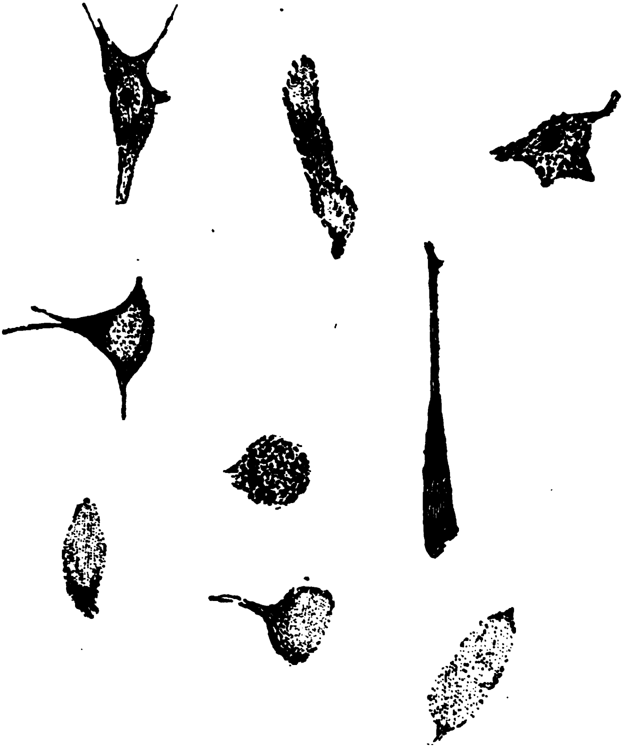

Fig. 6.

Isolated ganglion cells from anterior horns in a case of muscular atrophy in tabes.

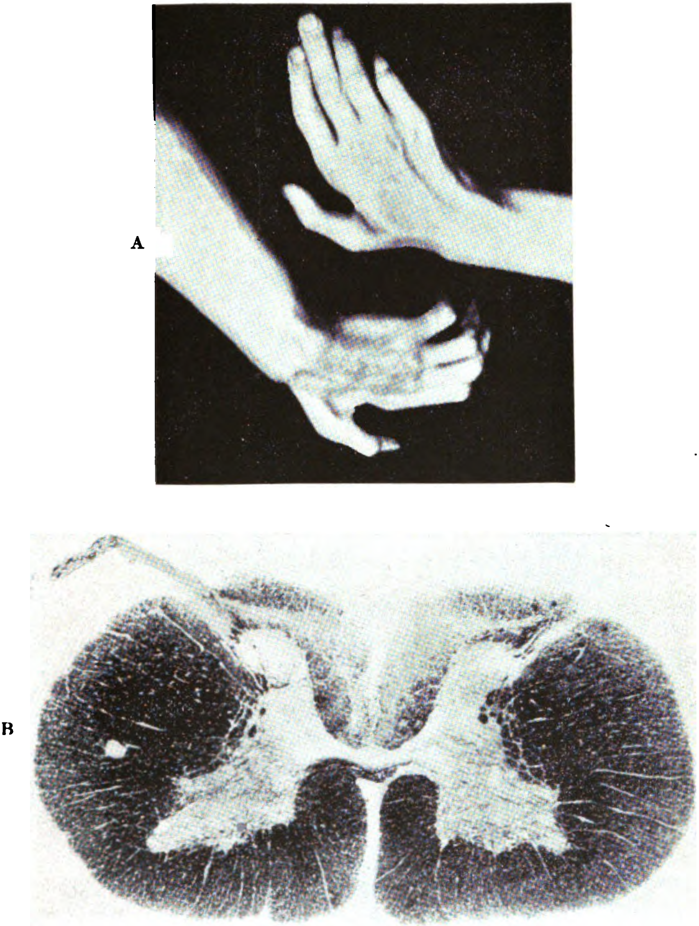

PLATE VII.

A. Atrophy of hand muscles in tabes.

B. Cervical cord showing lesion of tabes. (Case 1.)—S. A. K. Wilson. (Page 133.)

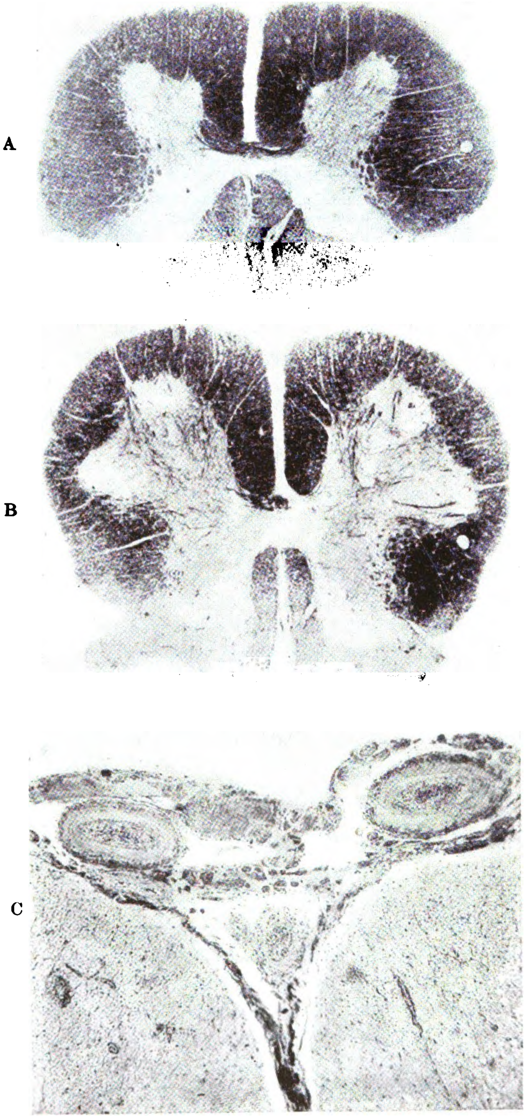

PLATE VIII.

Case of muscular atrophy in tabes. (Case 1.)

A. Thoracic cord. B. lumbar cord. C. showing thickening of spinal vessels and membranes.—S. A. K. Wilson. (Page 133.)

The Relationship Between the Muscular Sense and Tabetic Ataxia has been much discussed, and is of considerable practical importance in connection with the treatment of ataxia by exercises. There has been some difference of opinion as to the relative importance of disturbance of muscle-sense and that of joint-sense. This question is discussed by Karl Weiss [2] who defines muscular sense as including those sensations originating in the muscles, tendons and fasciæ by which the position of the limbs and their active and passive movements are appreciated. In this definition he follows Strümpell, while Oppenheim and Goldscheider also include the sense of weight and resistance. Strümpell is of the opinion that joint sensibility is of no importance. While not fully agreeing in this, Weiss, who supports himself by careful observations, concludes that when the muscular sense is intact, even marked impairment of joint-sensation may be compensated so as to permit of full co-ordination. He affirms that muscular sense is the chief factor in conscious orientation of the position of the limbs; that disturbance of joint-sense may be compensated when muscular sense is intact; that the intensity of the muscular sensation is directly proportionate to the strength of the contractions, hence the tendency of the ataxic patient to apparently unnecessarily strong contractions (as seen in the stamping gait). In the recumbent position the movements are more coordinate, the more acute the angle at which the limb is held.

Necropsy Findings in a Case of Tabes with Marked Narrowing and Rigidity of the Pupils. Inasmuch as the pathogenesis of the Argyll-Robertson pupil and of the myosis so common in tabes has not been settled, every contribution to the solution of this problem should be welcomed. Elmiger [3] reports a case of tabes in which these eye findings had existed for at least 15 years. The necropsy, in addition to degeneration of the posterior columns of the cord, revealed considerable hydrocephalus, diffuse chronic leptomeningitis, granular

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(2) Wien. med. Wochenschr., Mar. 4, 1911.
(3) Arch. f. Psychiatrie, Bd. 47, p. 819.

ependyma of the fourth ventricle and—what is most emphasized by the author—a high degree of round-celled infiltration of the trunk of the third cranial nerve (motor oculi). The myosis present is ascribed to constant irritation of those fibers of this nerve which supply the sphincter of the iris. Whether the rigidity of the pupils is due to the same cause or to the existing degeneration of the posterior columns of the upper cervical region of the cord can not be stated, according to the author.

Charcot's Joint and Spontaneous Fracture Without Other Symptoms of Tabes. Barré and Flandin[4] describe a patient, a chauffeur, 38 years old, with a typical Charcot joint of the right wrist and spontaneous painless fracture of the neck of the right humerus. The wrist was greatly enlarged and deformed, without pain on active and passive motion. This had come on two years previously, and the arm injury three months before. The reflexes and sensation were normal aside from a slight diminution of pain sense over the right deltoid. The Wassermann test, however, was positive, both in the blood and spinal fluid, and the latter apparently showed a trivial increase in leucocytes and albumen.

Barré also reports the case of a man, 65 years of age, who had syphilis at 19 and a typical Charcot's knee for fifteen years. For a few years he had some lancinating pain and for three months incontinence of urine. The pupils were unequal but reacted normally. The tendon reflexes were present, and sensation was normal. The Wassermann test was positive, both in the blood and the spinal fluid, but there was no lymphocytosis of the latter.

In discussing these cases, Babinski expressed the opinion that these arthropathies may exist without tabes, and that they are not necessarily dependent on the nervous lesions of the disease. They may develop independently on a syphilitic basis, like aortitis of the type commonly seen in tabetics. This is not admitted by Thomas and Déjérine who believe they occur only in tabes and

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(4) Revue Neurologique, Nov. 30, 1910.

syringomyelia, but may exist before other symptoms appear.

Barré[5] also reports a case of *perforating ulcer of the foot and arthropathy of the tarsus* without other features of tabes. Sicard and Babinski have also observed perforating ulcer in syphilitic subjects without tabes. It will, naturally, be necessary to follow these cases up in order to determine whether the ulcer merely is the first symptom of the disease. Babinski has seen perforating ulcer of the foot in tabetics without sign of other involvement of the sciatic nerve area, while it is extremely rare in the most severe sciatic neuritis in the absence of syphilis.

Charcot's Joints of the Spine. Salvadori[6] discusses arthropathies of the spine in tabes, considering all the reported cases which are few. The most complete description is that by Abadie, who gives the following features as characteristic of his case:—1. Deviation of the spinal column. 2. Diminution in the height of the vertebral body with osteoporotic condition. 3. Irregularities of the articular surfaces. 4. Enlargement of the spinal processes, while the transverse processes are almost absent. 5. Maximum involvement of the third and fourth lumbar vertebræ. 6. Production of osteophytes. In most of the other cases reported the lesion was also in the third and fourth lumbar vertebræ, and the changes were similar in character.

The author's own case was that of a woman, 40 years old, who probably had contracted syphilis at her marriage at 18. At 26 years of age she complained of abdominal pain without vomiting, and at 28, of lancinating pains in the legs. A few months later vision began to fail and a choroiditis was diagnosticated. In February, 1909 (at 39), severe lumbar pain came on, and operation for supposed floating kidney was performed without relief. The pain assumed a girdle character and was aggravated in the standing position. There was slight impairment of the outward movement of the right eye. The almost complete blindness of the right

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(5) Revue Neurologique, Dec. 15, 1910.
(6) Nouv. Icon. de la Salp., Vol. 23, p. 416.

eye was found to be due to detachment of the retina, and the left eye showed choroiditis. The right pupil was rigid while the left one reacted feebly in accommodation and not all to light. The patellar and ankle-jerks were absent, the Romberg sign present. There were also zones of diminished sensation on the trunk and arms. As the spinal fluid showed lymphocytosis the diagnosis of tabes must be considered justified. Radiographic examination of the spine revealed the following:

1. Lordosis and scoliosis of the lumbar region with the convexity to the right.
2. Rotation of the lumbar vertebræ, especially the third and fourth, in such a manner that the spinous processes are not on the antero-posterior but on the transverse axis.
3. Antero-lateral displacement of the third lumbar vertebra for a distance of about an inch.
4. Depression of the left half of the body of the third lumbar vertebra.
5. Irregularity of the articular surfaces of the third and fourth lumbar vertebræ.
6. Diminution in size of the transverse processes of the same vertabræ.

Febrile Crises occur occasionally, according to Stange and Brustein,[7] and have previously been described by Hoffmann and Wagner, who attribute them to a central disturbance, and by others. The present authors report a case in a man of 32 years of age, with undoubted tabes. The only disturbing feature is that the "temperature crises" followed a fall causing fracture of a rib and expectoration of blood. However, these attacks continued for several months and after the effects of the injury had apparently subsided.

Treatment of Tabes. A discussion of the treatment of tabes dorsalis at the meeting of the *British Medical Association* in 1910 was opened by Risien Russell[8] who advocated the inunction method versus injections of mercury in various forms. He usually gives a course of 100 rubbings to be followed in three to six months

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(7) Berlin. klin. Wochenschr., Mar. 20, 1911.
(8) Brit. Med. Jour., Oct. 22, 1910.

by another course of not less than 50 rubbings which should be repeated every six months for three years if there is no contra-indication. In the discussion, Lievin of Aix-la-Chapelle, supporting himself on his experience with 251 cases, also strongly indorsed the greater efficacy and safety of the inunction method. He finds that sulphur water taken internally as well as sulphur baths of medium temperature materially aid the absorption of mercury. If there is loss of weight he looks after the diet and exercise and employs the injection of tonic arsenical preparations, strychnin, fibrolysin or lecithin. The Frenkel exercises should be carried out, and to this extent, that "every voluntary movement, such as moving from one chair to another should be undertaken as a task of the Frenkel system, the patient exercising control over such muscular act just as if he were carrying out his prescribed Frenkel's exercise."

E. Farquhar Buzzard made the following remarks which are so much to the point as to deserve being quoted in full:

"From personal experience of the use of mercury in tabes, I feel convinced that it is not only the most rational, but the most successful means at our disposal of staying the course and relieving the symptoms of that disease. No one would maintain that mercury or any other drug can restore to life neurones which are already dead. On the other hand, when tabes exists it is our duty to use such measures as are most likely to check the spread of the morbid process. In spite of the opinion expressed by some observers that antisyphilitic treatment is useless and sometimes harmful in parasyphilis, clinical experience has led me to believe that while the iodids are comparatively inactive, real benefit can in most cases of tabes be derived from the employment of mercury. If it occasionally fails, one has to remember that failure is not so uncommon when we are dealing with ordinary syphilitic affections of the nervous system by the same methods; and most of those present to-day must have seen severe cases of cerebrospinal syphilis go from bad to worse during the administration of antisyphilitic remedies. While agreeing with

Dr. Russell that inunction is on the whole the most satisfactory method of giving mercury to patients suffering from tabes, I have not formed quite so poor an opinion of the results which can be obtained from giving the soluble salts by the mouth as he has expressed. In out-patient hospital practice this method is often the only one available, and I have seen most satisfactory improvement follow in many cases, even when no other form of treatment has been associated with it. I have now under my care patients who have been taking mercurial salts in this way for seven or eight years with short intermissions, and who have been relieved of many of their symptoms while continuing to carry on their work and supporting their families.

"It is usual to find that the administration of mercury by any method is attended by great improvement in general health; the body weight increases, the color improves, energy is restored, lightning pains become very much less severe and sometimes disappear, and even trophic disturbances such as perforating ulcers rapidly heal. In endeavoring to explain the difference of opinion which undoubtedly exists as to the efficacy of this treatment, I would emphasize the importance of persevering with it. One is constantly told that tabetic patients have had mercury at some time or other, and often that it has appeared to be of benefit; but the treatment has been discontinued, with the result that symptoms have returned in just the same way as they are certain to do in any case of cerebrospinal syphilis which does not submit to repeated courses of mercury for prophylactic reasons. When asked as to how long treatment must be continued, I can only answer that we have no means of deciding when it is safe to give it up, and that it is much wiser to go on repeating the courses indefinitely than to run the risk of allowing fresh exacerbations of the disease to present themselves. This statement is true of syphilis in all its manifestations, and great harm has been done in the past by the too arbitrary pronouncements of medical men that two or three or four years' treatment is sufficient to effect a cure. I agree with Dr. Russell when he states that the distance of time between the primary sore and the tabetic symptoms ought not to influence the doctor against prescribing mercury; and I would go further and say that the presence of optic atrophy is no contra-indication to the use of that drug. In conclusion, may I suggest that the necessity for the use of numerous valuable remedies which we possess for the relief of the distressing symptoms of tabes would be very much diminished if patients suffering from this disease were universally and perseveringly subjected to efficient mercurial treatment, preferably by means of inunction?"

The Mercurial Treatment is also discussed by A. Strassner.(9) He considers the three following measures the most important points in the treatment of tabes: 1. Avoidance of every form of overexertion. 2. Hydrotherapy. 3. Frenkel's exercises. He finds that mercury often quickly removes ocular paralysis and other symptoms, but is inclined to look upon these transient symptoms which yield to mercury as syphilitic and not truly tabetic. He has also found that the Wassermann-negative cases, which presumably are free from superadded true syphilis, respond much less favorably to mercurial treatment.

The Results of Antisyphilitic Treatment in Tabes. Frank Billings(1) gives a very instructive analysis of 100 undoubted and well-observed cases of tabes; 96 were men and 4 were women, a proportion which the author believes to be about the usual one in this country, while one finds a larger number of female patients in foreign countries, especially on the Continent of Europe. [Starr observed 405 cases in men and 52 in women in New York.—ED.] 72 of the men admitted syphilis and it is interesting that the Wassermann test which was made in 12 men who denied infection was positive in 10 cases. [This is 83 per cent., or fully as frequently as in cases where syphilis is known to have been present, a capital argument for the existence of syphilis in all cases.—ED.]

"The specific treatment used in the majority was mercury. Twenty-five have had deep intramuscular injections of mercury under my own personal supervision. Four others have had the intramuscular injections under their physicians and in three the treatment was by inunction, or mercury by mouth. The form of mercury used for the injections was usually corrosive sublimate in the following solution: ℞: hydrargyri chloridi corrosivi, gr. 15; acidi phenici, gr. 15; sodii chloridi, gr. 30; aquæ destillatæ, oz. 2. Misc. Of this solution 10 m., equal to gr. 1-6, to 20 m., equal to gr. 1-3, was injected deeply into the gluteal muscles 20 to 25 times during a period of about two months. In some patients a suspension of salicylate of mercury in liquid petrolatum was used in the dose of ½ to 1 gr. for 20 to 25 injections. The succinamid of mercury in the form of hypodermic tablet, gr. 1-5 to gr. 1, has been used.''

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(9) Wien. med. Wochenschr., Feb. 2, 1911.
(1) Cleveland Med. Jour., January, 1911.

Rest in bed during the injection treatment is considered an almost necessary part of it. ''If the patient is permitted to go about, the periods between injections must be increased and sometimes not more than one or two a week may be given. The result is not as good as when the patient is at rest. The possible explanation may be based on the theory of Ehrlich: that the spirochetæ are overwhelmed with the vigorous use of the drug while a lesser quantity may immunize the parasite to the remedy.'' The author has little faith in the value of iodids in tabes, but states that their use begun ten to fourteen days after the last injection may activate the mercury within the body and make it more efficacious. 10 or 20 grains three times a day may be used for two or three weeks of each month, beginning ten to fourteen days after the last injection.

As to results F. Billings says: ''Twenty of my patients have been very much improved. Five have had a return of the knee-jerk under reinforcement, and in three a sluggish light pupillary reflex has returned. The lightning pains have been very much improved in all. Fatigue, exposure to cold, etc., causes a return of the pains, but as a rule they are not as severe as formerly. Gastric crisis has disappeared in 5 of the 7 who were treated. As already stated, 2 of the patients died of paresis, and this occurred while they were under energetic mercurial treatment. Three have progressed to a much worse condition in spite of the treatment. The 4 patients who were treated by intramuscular injections by their physicians are reported to be improved. Three patients who had vigorous treatment by mouth and by inunctions have been very much improved. One of these is notable inasmuch as his condition is practically normal. Fourteen years ago his knee-jerks were entirely absent. He had the Argyll-Robertson pupil, a considerable incontinence and irritation of bladder and severe lightning pains. His pupils are now sluggish to light, his knee-jerks are present with reinforcement, his bladder is normal and the lightning pains are practically gone.''

His experience with salvarsan is of particular interest: ''During the last two and a half months I have used Ehrlich's '606' in the dose of gram. 0.4 to 0.6 in 11 patients suffering with tabes. Ten of these patients were selected because they were Wassermann-positive and did not present evidence of heart, blood-vessel, kidney or optic-nerve disease. One patient was given a dose at the request of his physician and himself, although he suffered from the optic neuritis and was Wassermann-negative. One may not say at this time what the result of the treatment by '606' may be. The Wassermann tests have been repeated as late as 45 days after the injection of '606' in all these patients but one. In 2 the Wassermann has become negative. In all of the remainder tested, it still is positive. The drug was given in the alkaline suspension-form subcutaneously under the shoulder-blades in the first few patients treated. Ehrlich advised it to be given in alkaline solution deep into the gluteal muscles, and this has been done in the last few patients injected. All of the patients injected showed a leucocytosis of 12,000 to 18,000 on the following day. There was a slight subfebrile to febrile disturbance and in a few, some headache, general muscular soreness and in 2 or 3 there was nausea. The immediate result in all of the patients has been the entire subsidence of pain. In one patient with a very severe hyperesthesia of the trunk, who had required, ineffectually, the use of morphin for three or four weeks, there was entire cessation of pain. In one patient who suffered for ten months from a severe radial neuritis, seven months of the time bed-ridden, there was entire relief of pain within twenty-four hours and a rapid subsidence of the serious condition of the hand and forearm within a few days. One patient suffered from a soft edema of the face involving the eyelids for a week following the injection. The appearance was like that following an overdose of arsenic by mouth. Arsenic appears in the urine soon after the drug has been given and has continued in some of our patients for two months.

"It will be months or even years before we know the true value of '606' as an antisyphilitic remedy. If antisyphilitic treatment will stop the progress of locomotor ataxia at all, we may have perhaps in this drug a more valuable remedy than mercury. Until we know this, I believe we should continue to use mercury vigorously in patients suffering from tabes, but especially in those seen early and in those especially who are Wassermann-positive. Finally, our present knowledge of the cause of tabes and the fact that the virus of syphilis may remain active in the individual for years and finally produce destructive changes in the brain, cord and superficial nerves, whether we call it paresis, cerebral syphilis or locomotor ataxia, demands a more thorough and energetic specific treatment of syphilis in its early stages than has heretofore been given by the majority of the profession. If mercury by mouth or by inunction or by injection in adequate dosage may produce immunity to the drug in the *Spirocheta pallida,* then the largest possible dose should be given and continued until the infection is cured."

Thomas and Barré[2] comment on the good effect of mercurial treatment on the arthropathies of tabes ("Charcot joint"). They report the case of a tabetic man, 59 years of age, with a severe affection of the ankle and foot, the latter being greatly swollen and incapable of flexion or extension. He was given daily injections of

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(2) Revue Neurologique, Apr. 30, 1911.

eneso , and improvement set in after three days. The patient could walk well again and recovered good mobility at the ankle. They have had similar results in another case. Breücq,[3] of Lille, has had similar experience with mercury, while Therstappen [4] observed great improvement of an osteo-arthropathy of the tarsal bones and joints as well as healing of a perforating ulcer of the foot after a single injection of salvarsan.

Treatment of Tabes and General Paresis with Enesol. Ernst Frey,[5] on the basis of personal experience and that of a large number of authors cited, has become convinced that salvarsan is of practically no value in parasyphilitic diseases. He is, however, convinced of the great value of enesol both in relieving symptoms and in modifying the morbid process. Enesol contains 38.46 per cent. of mercury and 14.4 per cent. of arsenic, in combination with salicylic acid. It is soluble in water, is but very slightly toxic, and causes little pain and reaction at the point of injection. According to many observers it has a good tonic effect and increases materially the number of red blood corpuscles. Its value in parasyphilitic diseases has previously been studied, particularly by Hudovernig in 15 cases of tabes and general paresis. He not only observed the disappearance of subjective symptoms but claims that even the light reaction of the pupils and the ankle-jerks, previously abolished, were noted to return. There were no harmful effects except stomatitis in 2 cases.

Frey has used the remedy for 3 years in over 70 cases, 46 per cent. of whom he has been able to follow up. He injected the entire contents of an ampoule containing 2 c.c. of solution (prepared by Clin) into the gluteal muscles every other day. After 10 injections treatment was suspended for 8 to 10 days. The total number of injections varied from 15 to 30. There never was any severe local reaction and he never observed sore gums or other toxic effects. In 16 cases of tabes with ocular paralyses no effect was obtained in 1 case; 4 were markedly improved and in the remaining 11 cases the paral-

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(3) Nord Médical, Aug. 10, 1910.
(4) Münch. med. Wochenschr., Dec. 20, 1910.
(5) Berlin. klin. Wochenschr., June 26, 1911.

ysis disappeared entirely. In cases of ptosis the result is particularly surprising, and recovery resulted even after the paralysis had existed for three or four years. The lancinating pains lessened after 5 or 6 injections and in most cases disappeared after 20 or 30 injections. In some cases there had been no recurrence after two years. His figures show that in 28 cases of tabes with pains, complete relief was obtained in 23 cases, or 82 per cent., while Hudovernig obtained the same result in 63 per cent. of his cases. Of 6 patients with gastric crises, 5 were completely and 1 partly relieved. The ataxia and urinary disturbances were only moderately improved.

The reaction of the pupils to light was modified in only 1 case, in which the pupils previously were of different size and reacted sluggishly to light. After 30 injections the pupils became equal and reacted normally and other ocular paralyses also disappeared. In this case, however, while certain of the existence of tabes, the author considers it possible that the ophthalmoplegia had been due to a tertiary syphilitic lesion as the first symptoms appeared only six months after the chancre. In one case the knee-jerks returned and the ataxia and gastric crises disappeared, the Argyll-Robertson pupil alone remaining. One case of syphilitic hemiplegia which was not influenced by salvarsan, improved markedly on enesol. The Wassermann test was made in 31 cases, 25 of which were positive before the treatment. Repeated tests were made, and 10 cases became negative after 20 injections, 5 after 25 injections and 3 after 30 injections; that is, 18 cases or 72 per cent. gave a negative reaction after treatment.

Treatment of Tabes by Intraspinal Injections. The demonstrated difficulty with which medicinal substances pass into the spinal fluid and the increased impermeability in tabes naturally suggest the advisability of direct introduction of the remedies into the spinal canal. A couple of years ago, Heym, of Chicago, reported good results with sodium cacodylate, and now Sappey (6) reports 12 cases treated with spinal injections of electro-mercurol in Carrien's clinic in Montpellier. One to three mgr. (1/60 to 1/20 grain) were injected. There was a painful reaction necessitating morphin but no serious symptoms were ever observed. There was marked improvement in the sphincteric disturbances, ataxia, lancinating pains, and gastric crises, together with a return of the cerebrospinal fluid to a normal condition; the lymphocytosis disappeared and the albumen diminished. This improvement came on after a few injections.

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(6) Thèse de Montpellier, 1910. Abstract in Revue Neurologique, Vol. 20, p. 573.

The author assumes a double effect to take place: 1. Substitution of a "therapeutic" acute meningeal irritation for the chronic tabetic meningeal process involving the roots, the active leucocytosis produced causing resorbtion by phagocytic action of the meningeal thickenings caused by the chronic process. 2. Slow action on the root and cord degeneration, perhaps due to catalytic properties in the electro-mercurol, causing a "diastasis" enabling the leucocytes and certain connective tissue cells to "digest" the sclerotic tissue.

Cyanid of mercury was similarly employed by Sicard[7] in 14 cases of tabes. He too aims at the production of a meningeal reaction which also may be obtained by the use of normal salt solution or a weak solution of stovain with the addition of a little alcohol. After two such injections he adds 1/200 or 1/300 grains (0.2 or 0.3 mgr.) of cyanid of mercury to 3 or 4 c.c. of salt solution. A more active reaction is then obtained, and in addition the direct action of the mercurial salt. He had good results in selected cases of tabes mainly involving the lower part of the cord with prominence of such symptoms as lancinating pains, vesical crises, sphincteric disturbance and difficulty in walking. Sometimes three or four injections at intervals of one to three weeks were made.

ACUTE ANTERIOR POLIOMYELITIS.

Infection of Rabbits with the Virus of Poliomyelitis seems possible according to Henry K. Marks,[8] while

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(7) Comptes Rend. de la Soc. de Biol., July 1, 1910.
(8) Jour. of Exper. Med., August, 1911.

many investigators have failed, including Flexner, Lewis, Landsteiner and Levaditi. The first to report positive results in rabbits were Krause and Meinicke.[9] The lesions characteristic of the disease in man and the monkey, however, have not been reproduced in rabbits. Marks found that the rabbits inoculated with monkey material (filtrate from the cord) sometimes died between the eighth and the fifteenth day. Paroxysms of general convulsions set in ten to thirty minutes before death. The necropsies showed only marked cerebral hyperemia and no other striking condition of the nervous system or other organs. The histologic picture of poliomyelitis was wholly missing, but a morbid process certainly occurred and the disease was transmitted through a series of six rabbits. That these animals harbored the virus of poliomyelitis was shown conclusively, as monkeys inoculated from the second, fourth, and sixth rabbit all died and exhibited the typical cord lesions.

These results suggest certain possibilities in the transmission of the disease to man which are thus stated by Marks: "It is now established that the virus of the disease can survive and probably even be propagated in a domestic animal that does not show any of the peculiar symptoms of epidemic poliomyelitis as it occurs in man. Conceivably, therefore, some animal, in relation to man, may act as a reservoir for the virus, which only occasionally and under special and peculiar circumstances transmits it to human beings. That such animal reservoirs of pathogenic micro-organisms exist in nature has been conclusively proven by the establishment of the connection between infected goats and Malta fever; and rendered probable in another instance by reason of the finding that the wild antelope, without itself exhibiting obvious evidences of disease, can readily be infected with the trypanosome of sleeping sickness, from which *Glossina* may become infected."

Early Diagnosis by Lumbar Puncture. Flexner and Clark[4] have observed that in the experimental disease

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(9) Deutsche med. Wochenschr., 1909, p. 1825, and 1910, p. 693.

(4) Jour. Amer. Med. Assoc., Feb. 25, 1911.

in monkeys the cerebrospinal fluid just prior to the onset of paralysis is slightly turbid and contains an excess of protein matter readily shown by Noguchi's butyric acid test. There is also an increase in cells, partly mononuclear, partly polymorphonuclear. The authors believe that the same findings exist in human cases and that the reported negative findings have been due to the fact that lumbar puncture has been postponed until some days after the onset of paralysis. This has been verified by Gay and Lucas[5] and more recently by Frissell[6] whose case report is very instructive.

A man, 21 years old, who three weeks previously had attended the funeral of a poliomyelitis victim, was taken ill on October 29 with malaise, chilly sensation, and headache. On October 30 he vomited, and on the 31st there was slight pain in the back of the neck. That evening the temperature was 101° F. The pharynx was slightly reddened. The tendon reflexes were increased. The leucocyte count was 12,000, with a relative increase in the lymphocytes. On November 2 fever persisted (101.6° F.), and the neck was still rigid. The diagnosis was obscure, resting between typhoid fever, gastro-intestinal toxemia, meningitis, and poliomyelitis. Lumbar puncture was performed, and the fluid examined by Flexner who reported as follows:

"The first specimen, received on November 3, consisted of a limpid fluid, almost but not quite clear, and yet not turbid, showing on agitation a faint opalescene. On centrifugalization, the fluid yielded sediment containing a considerable number of small and a small number of large lymphocytes, and a very few polynuclear leucocytes. There were no red blood-corpuscles present. The perfectly clear supernatant fluid gave a marked protein reaction with Noguchi's butyric acid test. The specimen, therefore, contained an excess of white corpuscles, chiefly lymphocytes, and of protein. The condition of the fluid resembled that seen in monkeys inoculated with the virus of epidemic poliomyelitis, just before the onset of paralysis."

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(5) Archiv. of Int. Med., September, 1910. See Practical Medical Series, 1910, Vol. X, p. 134.

(6) Jour. Amer. Med. Assoc., Mar. 4, 1911.

The next morning the knee-jerks were very weak and retention of urine set in, followed in the evening by paralysis of the left hamstring muscles and complete loss of both knee-jerks. On November 4, lumbar puncture was again performed and 10 c.c. of fluid obtained by a rapid drop flow. The leucocytes showed a slight increase; the polymorphonuclears dropped to 63.5 per cent., the lymphocytes to 27.5 per cent. Dr. Flexner's report justified the belief that the height of the irritative stage had passed. It was as follows:

"The opalescence is less, so that the fluid is, to all intents, 'clear.' The sediment obtained by centrifugalization showed still an excess of lymphocytes, but the supernatant fluid showed a diminished reaction for protein. This second fluid resembled that of monkeys after the paralysis had set in."

On the following day weakness of the extensors of the left foot and the anterior tibial group was first noted. The paralysis of the bladder lasted twelve days. Reaction of degeneration did not set in, and the knee-jerks returned in a few days. Within a month the patient was up and three months later only a slight foot-drop remained.

Abortive Cases. Since the fundamental observations of recent epidemic poliomyelitis by Wickman in Sweden and Harbitz and Scheel in Norway the existence of abortive cases, *i. e.*, cases without residual paralysis, has been generally admitted, but methods enabling us to prove this assumption in a given case has only recently been forthcoming. Anderson and Frost (8) of the Hygienic Laboratory in Washington, D. C., who made a study of the Iowa epidemic in 1910, studied the serum from 9 suspected abortive cases and found that in 6 of them the serum possessed the same germicidal action as the serum of a patient with paralysis, and would protect monkeys inoculated with active virus from contracting the disease. They were stimulated to making these experiments by a similar observation in one case by Netter and Levaditi,(9) and Flexner and Clark record another instance to be related below.

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(8) Jour. Amer. Med. Assoc., Mar. 4, 1911.
(9) Compt. Rend. de la Soc. de Biol., 1910, p. 855.

The Cerebral Forms of Poliomyelitis and Their Differentiation from Meningitis. Koplik[1] reports 6 cases in which the diagnosis at first was difficult. All of the patients were children and all recovered, some of them with strabismus or slight facial paralysis left behind. Lumbar puncture was made in 5 of the cases, and the fluid was clear or slightly flocculent, without bacteria but with an increase in cells, 90 to 100 per cent. of which were lymphocytes. While the author convincingly shows that these patients did not have ordinary meningitis, but polioencephalitis, the evidence that the infective agent was that of poliomyelitis consists in the occurrence of the cases at a time when poliomyelitis was epidemic in the vicinity. In view of similar experience elsewhere and the occurrence of similar cerebral "equivalents" in the experimental disease in monkeys it is in all likelihood correct that we are dealing with a cerebral form. Stress is laid on the fact that in these cases, unlike those of true meningitis, there is a short preliminary period of a day or two in which the patient has a high fever but does not take to his bed.

After describing all the cases Koplik writes: "I have thus described a condition which is of great interest. It is apt to be and is constantly mistaken for meningitis of the cerebrospinal acute suppurative or subacute tuberculous form. The onset of the illness is acute; it begins with a previous history of absolute health. After the acute symptoms set in, there may be in some cases an abatement and then a recurrence of symptoms of a cerebral nature, which gradually deepen. If the case is one resembling an acute meningitis, the symptoms are more active, with neck rigidity, pain in the neck, headache, and delirium. If the case resembles the tuberculous forms of meningitis, the patient lies more quiet, exhibits palsies of the cranial nerves, and may even have marked hydrocephalus with distinct Cheyne-Stokes respiration and unconsciousness. In both sets of cases the delirium, sopor, or coma lightens, the patients after a week or more of illness becoming brighter, and recovery proceeds. Lumbar puncture in all the cases reveals a clear or

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(1) Amer. Jour. Med. Sciences, June, 1911.

slightly flocculent fluid, without bacteria, and a cytology of 90 per cent. to 100 per cent. lymphocytes. An examination of the blood shows a leucocytosis, at first of pronounced degree and of the polynuclear type.

"The onset of the disease may be ushered in by fever, which rapidly subsides to within a fraction of a degree of the normal, and the major part of the illness runs its course with this temperature, which is practically normal. The diagnosis is made from the points of clinical course laid down in this paper. The prognosis is for the most part good, except in those cases which involve the nuclei of the nerves controlling respiration. In such cases the outlook is that of an acute bulbar paralysis where the extent of the lesion will decide the fate of the case. The main point is to have in mind the great similarity of a certain set of these cases to those of tuberculous meningitis, and the absolute futility of a positive diagnosis without study of the case, lumbar puncture and all the clinical aids at our command."

Is There a Polyneuritic Form of Poliomyelitis? Wickman[2] reports the case of a boy 3½ years old, who was bitten by a snake, and ten days later developed sore throat followed in one day by pain in the legs and in a few days more by paralysis successively involving the legs, trunk, and arms. There were incontinence of urine and retention of feces. The nerve trunks were tender to pressure, and there was severe pain on passive motion of the extremities while there was no impairment of sensation to touch or pain. The tendon reflexes were abolished, and reaction of degeneration and atrophy appeared. In short, the picture of multiple neuritis was perfect, and this diagnosis was at first made, the snake bite being considered the source of the intoxication. However, the subsequent course showed that the case was one of poliomyelitis as after a year considerable residual paralysis remained, the distribution in the arm being particularly characteristic. The snake bite was a mere coincidence. This case might justify the term "polyneuritic" form of poliomyelitis in a clinical sense, but the existence of an actual neuritic lesion is doubtful.

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(2) Zeitschr. f. die gesammte Neur. und Psych., 1910.

Later a report on this same question by Modena and Cavara,[3] is to the effect that histologic examination has revealed lesions in the anterior horns, together with evidences of peripheral neuritis. Their patient, a victim of pulmonary tuberculosis, while still actively working, was suddenly taken ill in October, 1901, with fever, chilliness, and nausea, followed by pain in the extremities which was considered rheumatic. After seven days he tried to work again but the limbs were weak and painful, so he had to go to bed after another week. In two or three days both hands became paralyzed, and later muscular atrophy appeared. A physician in Spain made the diagnosis of multiple neuritis. The paralysis improved but the lung trouble reappeared, and the mind became affected. In December, 1904, thorough examination was made. The pupils were normal. There was atrophy of the small hand muscles, which were weak. The nerve trunks of the arms were tender to pressure. There was slight atrophy in the feet and legs, especially of the peroneal muscles. The knee-jerks were weak, the ankle-jerks present, the plantar reflexes absent. The feet and leg movements were weak, especially those of the toes. The gait was of the "steppage" type. There was slight impairment of tactile sensation in the feet, hands and forearms. The sphincters were not affected.

The patient died of pulmonary tuberculosis in December, 1905. The findings in the nervous system were complicated and consisted of atrophy of the anterior horn cells of the whole cord; changes interpreted as chronic inflammatory in the thoracic region of the cord, mainly in the anterior horns; considerable loss of fibers in the crossed pyramidal tracts; chronic interstitial changes in the peripheral nerves. [That this case is a mixture of toxic multiple neuritis and a diffuse myelitis, chiefly of the anterior horns, will be admitted. But there is little reason to suppose that the lesions were caused by the virus of ordinary poliomyelitis, and the case therefore is of no direct value in supporting the view of the existence of a "neuritic" form of poliomyelitis (Heine-Medin's disease). This is not claimed

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(3) Monatschr. f. Psych. und Neur., February, 1911.

by the authors, but the case has been so construed by some reviewers.—Ed.]

Syphilitic Poliomyelitis. That spinal syphilis with its erratic localizations occasionally happens to involve practically only the anterior horns and thus closely to simulate ordinary anterior poliomyelitis is not surprising. Undoubted cases of this sort have been reported, as by Nonne (3 cases) and Hoffmann (2 cases), all of which affected the upper extremity. This year Zadik[4] reports 2 new cases, also involving the arms. One came on gradually, and while the end condition resembled that of acute poliomyelitis, the history would practically exclude the latter. The presence of inequality of the pupils suggested syphilis, the existence of which was made certain as the patient two years before the onset of the arm affection had suffered from undoubted syphilitic sore throat. In the second case also there was a definite history of syphilis but the onset was sudden with severe pain in both shoulders. Here also pupillary anomalies existed. [The author is unfortunate in his remarks on differential diagnosis as he makes the statement that if the spinal fluid contains albumen and lymphocytes and if the Wassermann test with the spinal fluid is positive, then the diagnosis of syphilitic poliomyelitis is certain. No one disputes the value of the Wassermann test, but the presence of albumen and lymphocytes is as constant in the early stages of ordinary poliomyelitis as it is in syphilis.—Ed.]

Prophylaxis. The following discussion of the problem of the protection against contagion by John Lovett Morse[5] of Boston is worthy of serious consideration: "There is no question but that patients with acute poliomyelo-encephalitis should be quarantined in much the same way as those with scarlet fever and diphtheria. The only question is how long this quarantine should be. At the present time we have no data on this point. I have personally adopted three weeks as the period of quarantine. It may be, however, that three days is long enough, or it may be that three months is necessary. It would be of great advantage if the State Board

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(4) Berlin. klin. Wochenschr., July 10, 1911.
(5) Bost. Med. and Surg. Jour., Jan. 12, 1911.

of Health would set some definite time, even if this time is wrong and has to be changed later. Other questions which immediately arise are whether the other children in the family shall be allowed to mix with their playmates and attend school, and whether the attendants and other members of the family shall be quarantined. At present it seems wise to keep the other children of the family out of school for a number of weeks. It is hardly possible, however, to compel the adult members of the family to give up their work and pleasure.

"It is possible that hexamethylenamin may prevent the escape of the organism from the body. It seems wise, therefore, to give it to patients during the acute stage. It is also possible that it may hinder or prevent the development of the organisms in persons exposed to the disease. It seems reasonable, therefore, to give this drug to those who are exposed.

"Since peroxid of hydrogen destroys the organism, and since the organism is undoubtedly present in the nasopharynx in some if not in all cases, it seems rational to spray the nasopharynx of patients with weak solutions of peroxid of hydrogen in order to diminish the chances of the infection of others. Since the virus may enter through the nasopharyngeal mucous membrane, it seems reasonable to attempt to prevent such entrance by using peroxid of hydrogen in the nose and throat of those who have been exposed to the disease. It must be remembered in this connection, however, that peroxid of hydrogen is an irritant to the nasopharyngeal mucuous membrane of many people, and in such people it might further increase the danger of infection.

"A second attack of the disease is extremely rare in the same individual. Reinfection is impossible experimentally. Active immunity has been produced in animals. 'At present, however, the experimental basis is entirely inadequate to justify the attempt to induce active immunity as a protective measure in human beings."

Report on Prophylaxis.—A committee consisting of W. H. Frost of the U. S. Public Health and Marine-

Hospital Service, H. W. Hill of the Minnesota State Board of Health and Samuel G. Dixon of the Pennsylvania State Department of Health submitted to the *American Medical Association* a report on methods for the control of epidemic poliomyelitis.[6]

The frequency of the disease is commented on as follows: "As regards its prevalence, there can be no doubt that it has very greatly increased in recent years, especially in the United States. During the year 1909 not less than 2,500 cases were reported as occurring in epidemics in the United States. During that year 539 deaths, indicating probably not less than 5,000 cases, were reported from the registration area comprising 55 per cent. of the population of the United States.

"For the year 1910, 5,093 cases and 825 deaths have been reported to the Surgeon-General of the Public Health and Marine-Hospital Service from thirty-one states, the District of Columbia and Hawaii. It can hardly be doubted that these statistics give a very imperfect and much too low estimate of the prevalence of the disease. Granting, however, a prevalence several times as great as reported, a mortality of 5 to 20 per cent., and permanent disability in perhaps 75 per cent. of the survivors, still the magnitude of the public health problem involved has undoubtedly been greatly exaggerated."

The *recommendations* of the committee should be carefully read by every physician practicing in communities where the disease occurs. They are as follows: "The committee recommends, as the most important step toward the prevention of poliomyelitis, further studies of its means of transmission and of the factors of immunity. While it is hoped that experimental studies on the transmission of the disease will be continued and will be as productive of results in the future as in the past, neither recommendations nor prophecies in this regard come within the scope of this report. The collection of data which it is believed will greatly enlighten the question, and the collection of which is quite practicable, is recommended as follows:

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(6) Jour. Amer. Med. Assoc., Oct. 14, 1911.

"1. *Prevalence.*—It is obviously of the greatest epidemiologic importance to determine as accurately as possible the prevalence and distribution of the disease. This can be accomplished most efficiently and thoroughly through state and municipal health organizations, by requiring that poliomyelitis be reported as an infectious disease. In the absence of any definite diagnostic criterion except paralysis, reports could, for the present, be required of paralytic cases only. It is desirable, moreover, that morbidity and mortality statistics should, for the present, be based on definitely diagnosed paralytic cases. Abortive cases should be included wherever practicable in the statistics of the disease, but should be designated as such and tabulated separately.

"2. *Diagnosis.*—Further and more detailed studies of the symptomatology and of the blood and cerebrospinal fluid of patients in the preparalytic stage and of suspected abortive cases are needed to establish a more definite standard of diagnosis. For collective studies of this kind local medical societies have opportunities which are rarely available to public health organizations.

"3. *Epidemiology.*—In connection with the collection of morbidity reports, state and municipal health authorities can, by obtaining more detailed reports, collect data of considerable epidemiologic importance. Valuable studies based on data so collected have already been made by several state and city health organizations and by medical societies. The value of the data so collected would be much increased by greater uniformity in the methods of collecting them. The employment of a uniform blank for this purpose is recommended.

"It is necessary, however, for a better understanding of the transmission of the disease, that such studies be supplemented by more detailed information, based on a systematic epidemiologic study of individual cases by competent epidemiologists. Studies of this nature have already been undertaken in several states and have resulted in the collection of the most thorough, instructive and satisfactory data so far available.

"Pending the results of further investigations, the committee recommends the following preventive measures based on the assumption that the disease is directly transmissible from person to person.

"1. Isolation and screening of all patients known to have or suspected of having the disease. Since a positive diagnosis can be made only on the appearance of paralysis, which usually develops one to six days after the onset of febrile symptoms, and in abortive cases does not appear at all, isolation, to offer any hope of effectiveness, must be instituted on suspicion. Three weeks from onset is suggested as the period of isolation, although only a surmise can be made on this point.

"2. Disinfection of all discharges from patients, and of all articles used by them and their attendants.

"3. Fumigation of the premises with formaldehyd on release from isolation.

"4. A quarantine of persons in contact with patients does not seem at present justifiable. It is recommended, however, that members of patients' families be excluded from schools during the period of the patients' isolation and during the possible incubation period of a new case; that is, for three weeks following the end of the last exposure to the (presumptively) contagious person.

"5. For the protection of persons presumably exposed to infection, namely, those in contact with the sick and in communities where the disease is epidemic, the daily administration of hexamethylenamin seems to offer some hope of reducing susceptibility. It seems not unreasonable to suppose that susceptibility, especially of young children, may perhaps be further modified by preserving the gastro-intestinal tract in normal condition, by avoiding dietetic errors, by prompt attention to slight gastro-intestinal disturbances and by the avoidance of overexertion in hot weather. Rest, which seems to be an important therapeutic measure, may quite possibly have some prophylactic value.

"The committee is unable to express any great confidence in the efficacy of the measures above outlined. Even granting that the disease is transmitted directly from person to person by infectious secretions, the difficulties in the way of its prevention are great. It is often impossible to recognize even severe paralytic cases before the onset of paralysis, which may be several days after the onset of the disease. It is still more often impossible to recognize and isolate abortive cases, whose number may reasonably be supposed to be considerable. Chronic convalescent carriers, whose existence is probable, and healthy carriers, whose existence is not improbable, are not recognizable and hence cannot be controlled.

"Moreover, the disease is already widespread throughout the country, and experience with other infectious diseases has shown the difficulties which beset the eradication of a widespread endemic infectious disease by quarantine. Finally, it will be difficult to estimate the efficacy of preventive measures, since it is impossible to foretell the extent to which the disease is likely to spread in any community without the application of restrictive measures."

The Epidemic in the District of Columbia in 1910. A committee appointed to make an investigation secured data in 506 cases and has made its report.[9] There were 16 deaths, a morbidity of 3 per cent. The outbreak began in June, as did that in New York in 1907 and that in Massachusetts in 1909, and most of the cases occurred in July and August. During this time the rainfall was much less than normal. The age distribution was the usual one; 88 per cent. of 246 cases being under 10 years and 71 per cent. under 5 years of age. The youngest patient was four months old; the eldest, 64 years. In proportion to the population there were nearly twice as many cases among the white people as among the negroes. In 6 instances 2 cases occurred in the same family. Of the 246 cases, 17 had been exposed to cases in the acute stage, one to a recovered case, and 47 to possible abortive cases.

The observations on animals are interesting as there existed in one locality, prior to the appearance of the human disease, an epidemic among ducks and chickens of a disease associated with paralytic symptoms. How-

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(9) Wash. Med. Annals, May, 1911.

ever, laboratory investigations failed to connect the two diseases, but it was suggestive that a man who performed necropsy on two ducks, shortly afterwards developed poliomyelitis. Reports were made showing that 7 cases occurred in houses where there also was a sick dog; 7 in households in each of which a cat was sick, and 9 in households where chickens were sick.

The Epidemic in Idaho in 1910. Geo. E. Hyde,[1] president of the State Board of Health, gave the following summary of an epidemic in Idaho County: "The total number of cases was 54. Fourteen were abortive; 35 have paralysis (20 temporary and 15 permanent) and there were 5 deaths. These deaths occurred from the second to the fifth day of the disease. The onset was sudden in nearly all the cases. Twenty-two per cent. had stupor ranging to coma, lasting from 24 to 72 hours. Rigidity and hyperesthesia were present in one-third of the cases, and two had opisthotonos. Twenty-five per cent. commenced with vomiting. Sixty per cent. had obstinate constipation, but when the bowels commenced to move there was more than the ordinary amount of fecal matter of exceedingly offensive odor. After good passages were obtained all the acute symptoms subsided in all the cases excepting two.

"Forty-one cases were inquired into regarding the probable source of contagion, with the result that 12 could be accounted for by direct contact and 13 by relatives visiting and probably acting as carriers. Seven families had 2 cases each; one family with 3 and another with all the children contracting the disease. The period of incubation was four to five days, though one case developed after sixteen days. Sixty-six out of the 76 were 10 years of age and under, the most susceptible age being 2 years. There was one each of 17, 18 and 21 years respectively, the last named case dying with respiratory failure due to bulbar involvement.

"Three cases occurred in May; 14 in June; 51 in July and 8 in August. Buhl, in Twin Falls County, had 3 cases from May 19 to July 3. The cases occurred in all classes, in the most cleanly as well as the careless

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(1) Northwest Med., November, 1910.

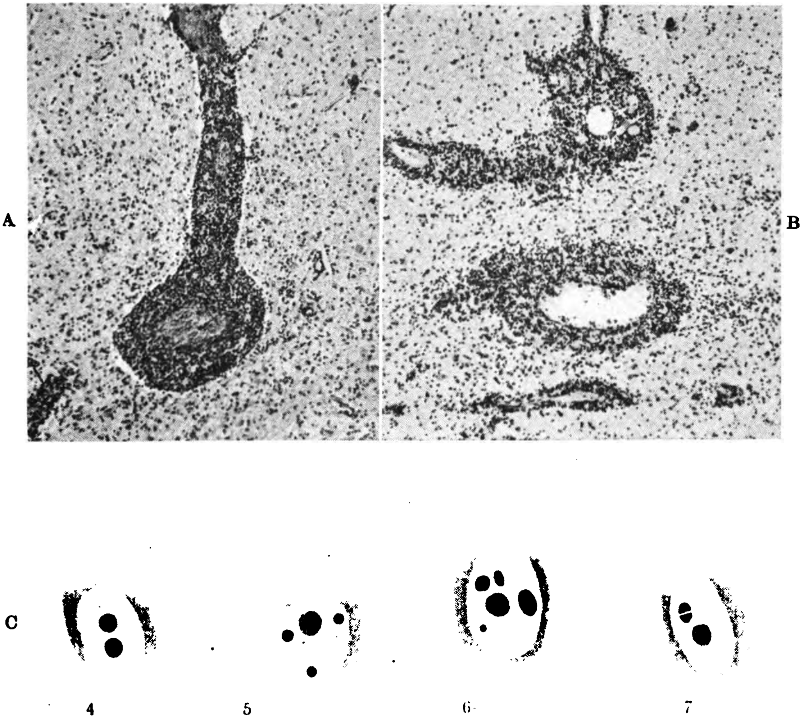

PLATE IX.

Epidemic encephalomyelitis in horses ("Borna disease"). A. Cell infiltrations in caudate nucleus. B. Cell infiltrations in temporal lobe. C. Inclusions in the ganglion cells of the Cornu Ammonis.—Joest. (Page 163.)

and dirty homes, though the majority were in the latter.''

ENCEPHALOMYELITIS.

The ''Meningitis Cerebrospinalis Enzoötica'' of Horses, also known as ''Borna disease,'' has been subjected to an extensive anatomic study by E. Joest[2] professor of pathology in the well-known veterinary college of Dresden. The results were of great interest on account of the marked resemblance between this disease and epidemic poliomyelitis in man. Fifty-four cases were examined. The gross findings are not characteristic as the meninges are smooth, free from exudate and merely show more or less hyperemia. The brain and cord substance also show no gross changes beyond slight hyperemia or edema. The cerebrospinal fluid shows no increase in albumen and the number of cells is only very slightly increased, the type of cell being that of the lymphocyte. On histologic examination a slight lymphocytic infiltration of the pia and arachnoid is encountered, but it does not constitute any more than what might be termed meningeal irritation.

The chief finding in this disease, as in human poliomyelitis, is the existence of accumulations of mononuclear round cells around the vessels of the brain and cord, more numerous in the gray matter than in the white matter. (See Plate IX.) By using the method of Mann for the demonstration of Negri bodies in rabies, peculiar bodies staining intensely red with eosin are seen within the nuclei of the large ganglion cells of the cornu Ammonis. (See Plate IX b.) There is no constant relationship between the inflammatory infiltrations and the cell inclusions, which argues against the assumption that the latter are the cause of the disease. As they are constant and peculiar to the disease it is thought that they may be products of a specific degenerative process produced by toxic products formed in the inflammatory areas.

The inflammation is much more pronounced in the brain than in the cord, and as a rule the regions most

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(2) Deutsche Zeitschr. f. Nervenheilk., 1911, Vol. 42, p. 293.

affected are the following, mentioned in the order of their severity: Olfactory lobe; caudate nucleus and hippocampus; parietal and temporal lobes; medulla oblongata; spinal cord and occipital lobe; cerebellum. It appears probable that the virus attacks the central nervous system primarily and that the inflammation does not extend from the meninges except in the olfactory lobe. The latter is the part of the nervous system first affected, and it is thought that the virus enters the body through the nose and follows the lymphatic channels of the olfactory nerve.

The resemblance of this disease to epidemic meningitis in man is only a clinical one, while the pathology quite closely resembles that of poliomyelitis, with the difference that the chief localization is in the brain. The histologic picture also resembles that of rabies and that of trypanosomiasis. (Sleeping sickness is the most important human form of the latter.)

ACUTE MYELITIS.

The Nature of So-Called Acute Myelitis. H. Charlton Bastian (3) reiterates the view which he has championed for over a quarter of a century, that most cases of so-called acute myelitis are cases of thrombosis and secondary softening analagous to ordinary cerebral softening. The present paper is chiefly devoted to an explanation of the failure on the part of medical writers, particularly in England, to accept this view. He believes that the main cause for the persistence of the belief that, while the softenings of the brain are the results of degeneration from vascular occlusion, those of the cord are due to inflammation, lies in the fact that embolism and thrombosis are both common in the brain and compartively easy to detect in its great vessels, while embolism is so rare as to be almost non-existant in the cord, and thrombosis is very difficult to detect because of the small size of the vessels. A special reason why the wrong view became prevalent in England is that it was given in the "System of Medicine" of

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(3) Lancet, Nov. 26, 1910.

Reynolds which appeared in 1865 and remained an authority for many years. In this work the softening of the brain was correctly dealt with.

Bastian rejoices that his views now are gaining ground, even in England. Thus Risien Russell in his Harveian Lecture for 1907 expresses himself as follows: "However, I venture to affirm that myelitis, if the term be strictly applied to an inflammation of the spinal cord, is in reality a rare malady, and that much of what is spoken of under this name is in reality a softening of the spinal cord consequent on vascular occlusion, in which inflammation plays no part, except it be that some inflammatory process in connection with the walls of the blood-vessels permits of the thrombosis or clotting which results in the softening."

Bastian finds that his views are confirmed by the following consideration regarding etiology and pathogenesis: "It is well known that so-called acute myelitis is met with principally among one or other of three classes of patients—namely, (1) elderly persons with degenerated vessels and, often, failing heart power; (2) young or middle-aged adults suffering from syphilis; and (3) children or adults when actually suffering from other infectious diseases, or during periods of convalescence therefrom.

"In the first of these categories we have the two best known and most potential causes favoring thrombosis; in the second we have to do with a fertile cause of thickening of the external and middle coats of the arteries and of endarteritis, alike in the brain and in the spinal cord, such as lead on to thrombosis; while in the third category, in which acute myelitis is less common than in the other two, we have to do with blood changes and toxins, often associated with feeble cardiac action, which may well act as causes of thrombosis in vessels of the spinal cord as well as of other regions. In these infective conditions toxins may excite endarteritis in the small vessels, while, in addition, alterations in the character of the blood may also occur of a kind to favor the occurrence of thrombosis, as in convalescence from typhoid and other fevers, and after parturition." The sudden onset of the symptoms in most cases is also in accordance with the vascular theory.

[Most of us will agree with Bastian on these points, but he goes further and concludes that acute poliomyelitis also is caused usually by thrombosis; and in support of this claim he mentions the much quoted finding of thrombi in the vessels of the anterior horns, by F. E. Batten.[4] As a matter of fact, Batten's case must have been an exceptional one, as thrombi have been very rarely encountered in the very extensive pathologic work done in many countries during recent epidemics. —ED.]

RHIZOTOMY.

Rhizotomy: Resection of Spinal Roots. This operation which was briefly discussed in the *Practical Medicine Series,* 1910, Vol. X, p. 72 and 131, is deservedly receiving increased attention. The indications naturally group themselves in two classes, namely localized pain and spasticity. The experiences so far recorded in the two groups are best mentioned separately.

1. *Rhizotomy for Localized Pain.* Foerster, the originator of this operation, gave a lucid summary in a paper read in England on June 13, 1911.[5] Up to this time he finds reports of 25 cases of gastric crises operated. It has been customary to cut the seventh, eighth, ninth and sometimes tenth thoracic roots, but Foerster believes that some of the failures are due to the fact that probably the fifth and sixth as well as the eleventh and twelfth thoracic roots also carry sympathetic fibers of gastro-intestinal origin.

Of the 25 cases, 3 were fatal, 2 not benefited and 20 more or less successful. In 13 of the 20 cases relapse had not occurred at the time of publication which ranged from seven weeks to one and one-third years after operation in 6 cases, while in 7 cases the interval is not stated. In 7 cases the crises returned but were of shorter duration, at longer intervals and much less severe than before operation. In all of the 20 cases the crises disappeared immediately after the operation, the

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(4) Brain, 1904, p. 376.
(5) Lancet, July 8, 1911.

body weight increased greatly and the general condition showed a marked improvement. Some of the patients previously bed-ridden returned to work.

It is important in every case to determine exactly the situation of the pain and the extent of the hyperesthesia of the skin as these data indicate the roots which are chiefly irritated. In a case reported by Guleke the crises which had ceased after resection of the seventh, eighth and ninth roots recurred and again disappeared after subsequent resection of the tenth and eleventh posterior roots.

At the same meeting Ernest W. Hey Groves,[6] of Bristol, related several cases three of which belong to this class.

Altogether the results of posterior root resection for pain other than gastric crises have been disappointing. The statistics of Groves covering 24 cases which include the 16 cases collected by Jacobi [7] in 1907, show that the pain returned in about 75 per cent. of the cases. The arm was affected in 15 cases, the leg in 6 and intercostal areas in 3. The operation resulted fatally in 4 cases, and 2 patients with cancer involving the brachial plexus died within a few weeks. Six had complete relief and six had partial relief. In a few cases the failure was likely due to incomplete division of the roots, but probably the majority of the failures are not accounted for in this way as there had been the most complete resulting anesthesia. It is difficult to explain the cause of the pain in these cases, and Groves suggests that in some cases it is evidently of psychic origin.

In gastric crises the results have been better, judging from the statistics of Foerster as related above. Thomas and Nichols [8] also review the literature on this operation for gastric crises which they say "should be considered seriously in all cases where the severity of the attacks has been such that the patients are forced to the use of morphin for relief, even when the attacks do not occur with great frequency, in order to prevent the formation of the drug habit, a thing which is practically

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(6) Lancet, July 8, 1911.
(7) N. Y. Med. Jour., 1907, p. 192.
(8) Jour. of Nerv. and Ment. Disease, October, 1910.

almost certain to happen where morphin is found to give relief from the symptoms which other drugs and other methods of treatment have failed to give." They report the case of a tabetic man with gastric crises who prior to the operation on March 3, 1910, had hypalgesia on the chest from the third to the fifth rib on the right side, and from the third to the seventh rib on the left side and hyperalgesia below this level to the umbilicus.

The arches of the fourth, fifth, sixth and seventh thoracic vertebræ were removed. The dura was opened and the pia was found to be edematous, gelatinous, almost a quarter of an inch thick. The seventh, eighth, ninth and tenth posterior roots were divided. There was no vomiting on coming out of the ether, and the epigastric pain which had been severe directly before the operation was entirely absent. There were, however, severe spasmodic girdle pains in the lower thoracic region, associated with spasm of the chest wall. It is a curious fact that on the day after the operation there appeared to be no loss of tactile sense on the abdomen while five days later there was diminished sensation to touch and pain below the third rib on the right side and the fifth rib on the left side down to half way between the costal margin and the umbilicus. In the course of a month the pain in the chest practically ceased and loss of pain and tactile sense became complete from the sixth rib to three fingers' breadth above the umbilicus.

2. *Rhizotomy for Spastic Paralysis.* Here the operation finds its greatest usefulness and the results have been fairly uniform. Thus Foerster gives the following summary of 62 cases: There were 5 deaths as the result of the operation. Of 37 cases of congenital spastic paraplegia (Little's disease), 36 were successful and 1 was not benefited. Three cases of acquired cerebral spastic paraplegia were all successful. Of 4 cases of spinal spastic paralysis of traumatic origin, two were successful and two were not benefited. (In one case the wrong roots were divided; and in the other there was complete interruption of the cortico-spinal tracts.) One case of spastic paraplegia from compression of the

cord in Pott's disease was successful. Two cases of Erb's syphilitic spastic paraplegia were successful. One case of "primary" spastic paraplegia was successful. Of 2 cases of disseminated sclerosis, one case was not benefited, and one case was successful but the disease rapidly progressing caused death. Of 7 cases of spastic paralysis of the arm, five cases were benefited; two cases were not successful because of complete interruption of the cortico-spinal tract.

As to indications Foerster states that "only lesions with real reflex spasticity as the result of the loss of the cortico-inhibitory fibers are suitable, but not the diseases of the type of chorea, athetosis, mobile spasms and spasmodic torticollis; possibly, however, Parkinson's disease may be suitable.

"Secondly, there must be a reasonable prospect of innervating fibers of the pyramidal tract still existing, all cases with slight spasms and considerable paralysis being unsuitable. In cases of severe spasms and total voluntary paralysis there may remain a considerable amount of voluntary excitability, only obscured by the spasms and only apparent after their elimination. In such cases the experiment is worth trying. The question whether any voluntary mobility remains may be decided by preliminary injection of stovain, which temporarily removes the spasms. The arm, as a general rule, is less suitable than the leg.

"Thirdly, the disease must have become practically stationary, whilst progressive diseases like disseminated sclerosis are hardly suitable, very slowly progressing ones, like spastic spinal paralysis, being perhaps more promising."

Like all other writers on the subject Foerster lays much stress on the after-treatment, chiefly exercises and use of removable splints.

Groves (*l. c.*) also reports good results in this group of cases. As to technic he has abandoned the osteoplastic flap method which he used in his first case, but he approves of Alfred S. Taylor's suggestion of hemilaminectomy, especially in the cervical region. He prefers completing the operation at one sitting and has found that the shock is slight. To minimize hemorrhage he follows the suggestion of Braun,[9] and injects two or three ounces of a 1 to 50,000 adrenalin solution into the subcutaneous and muscular tissues before the operation which then becomes an almost bloodless one.

DISEASES OF THE PERIPHERAL NERVES.

The Cranial Nerves.

THE OPTIC NERVE.

Pathogenesis of Choked Disc. "The Histopathology of Papillo-Edema" was the title of a preliminary report made to the *Royal Ophthalmological Society* by Leslie Paton and Gordon Holmes.[1] Their work was based on the histologic examination of 60 eyes, all from cases in the National Hospital for the Paralyzed and Epileptic, London. The conclusions they formed from these cases were that the so-called "optic neuritis" was a simple congestive edema of the disc, and was not in any way an inflammatory phenomenon. Inflammation when it did occur was slight in amount, limited in its distribution, and secondary in its nature. The hemorrhages that occurred were in the main congestive, but partly due to stretching and rupture of small vessels by the swelling disc. The larger white patches that occurred on or near the disc were due to degeneration of the nerve fibers. This degeneration showed itself first by varicosities appearing on the nerve fibers, which later swelled up into elliptical or globular bodies known as "cytoid bodies." These might lose their connection with the nerve fiber from which they developed, and consequently undergo fatty degeneration. The smaller bright-white spots arranged in fan-shaped fashion between the disc and macula were due to edema raising the *membrana limitans interna* into vesicles.

The changes produced as the disc became atrophic were (a) occlusion of the smaller vessels by endothelial

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(9) Deutsche Zeitschr. f. Chir., 1910.
(1) Abstract in Archives of Ophthalmology, May, 1911.

proliferation and adventitial thickening in the walls of the larger vessels, (b) a glial proliferation which varied in intensity with the degree of atrophy, and (c) proliferation in the mesoblastic tissues around the blood-vessels and without, forming the *lamina cribrosa.* The writers considered that the hypothesis which best explained all the known facts of tumor papillo-edema was that, owing to the rise of intracranial pressure, there was a communicated rise of pressure in the nerve sheath. The portion of the central vein lying in the nerve sheath behaved, in response to this raised pressure, like a cerebral vein, and the blood-pressure in it was consequently raised to the same extent. This produced a congestion of all the connections of the central vein distal from that point. In addition to causing venous congestion the raised intravaginal tension obstructed the normal drainage of lymph from the disk and nerve, and caused a lymph stasis, so that there was both an increased output and a diminished drainage. The tissue-tension in the nerve itself was raised, so there was no marked difference between intravenous pressure and tissue-pressure until the *lamina cribrosa* was reached.

THE TRIGEMINAL NERVE.

Curative Effects of Alcohol Injections in Trifacial Neuralgia. Sicard[2] finds that the relief after deep alcohol injections usually lasts twelve to eighteen months, and that recurrences yield promptly to subsequent injections. He now has had numerous cases under observation for seven years, and finds that the period of relief is longer after the third or fourth year of treatment. In some cases the relief at first lasted ten to twelve months and later 2½ to 3 years.

A Case of Trifacial Neuralgia Presenting Special Problems is reported by Baudouin.[3] The patient was a woman, 42 years old, with an arthritic diathesis, as is the case with most victims of tic douleureux according to the author. Her mother had rheumatism and migraine. The patient herself had had a few attacks of

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(2) Revue Neurologique, Dec. 15, 1910.
(3) Revue Neurologique, Jan. 30, 1911.

migraine and three attacks of hepatic colic. The facial neuralgia had existed for twelve years and appeared quite suddenly after childbirth. It was first localized in the left inferior maxillary nerve. For ten years she had pain every day except during pregnancies, but the pain would return on the day of delivery. For this reason she wished to be pregnant as frequently as possible, and had altogether twelve pregnancies, the last six of which resulted in miscarriages.

An alcohol injection in February, 1908, gave relief until August, 1910. In December, 1910, the inferior maxillary nerve was again injected, the needle being directed toward the foramen ovale by the usual method. Remarkably enough this was followed by anesthesia of the entire left side of the face, including the cornea and forehead. Nevertheless, it was necessary to make a second injection to relieve the pain. The explanation of the anesthesia involving the entire trigeminal area is that the alcohol must have penetrated to the Gasserian ganglion, and this is perfectly possible because the ganglion is less than 1 cm. above the foramen ovale. In fact Sicard has attempted to devise a method for injecting the ganglion itself by this route. The freedom from pain during pregnancy is explained by the increased thyroid activity during pregnancy, and the thyroid is thought to produce substances which successfully combat those resulting from the arthritic state which is responsible for the neuralgia.

The "Jaw-Winking" Phenomenon, or the associated movement of the levator palpebræ superioris during mastication is discussed by Gaultier and Buquet[4] who presented a case to the *Paris Neurological Society.* A man 55 years of age one morning suddenly felt cold in the left side of the face, and weak and uncomfortable in general. At breakfast his children laughed when he commenced to eat, the reason being that whenever he opened his mouth the left eyelid was suddenly raised, showing the sclera. When examined two weeks later there was no evidence of facial paralysis, but there was a slight degree of left-sided ptosis which the patient

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(4) Revue Neurologique, Apr. 30, 1911.

claimed had appeared on the day of onset of the present trouble. The raising of the lid also occurred when the patient looked downward or upward. There were no other nervous symptoms except a sensation of dryness of the mouth and swelling of the gums. The urine contained 11 grams of sugar per litre. The authors' explanation is that there is a normal tendency to associated movements of the muscles involved, and that as a result of a temporary affection of the facial nerve causing weakness of the orbicularis palpebrarum there was established a tendency to overaction on the part of the levator palpebræ superioris. Some 40 cases of this kind have been reported and in most of them a certain degree of congenital ptosis existed. [A child showing this phenomenon was presented to the *Chicago Neurological Society* a few years ago by Brown Pusey.—ED.]

THE FACIAL NERVE.

Facial Paralysis Following Tooth Extraction. A young lady who developed total peripheral facial paralysis one-half hour after extraction of the first upper molar tooth was presented to the *Berlin Neurological Society* by Schuster.[5] She first noticed that she could not close the right eye. Partial reaction of degeneration was present, but improvement set in within a few weeks. Frankl-Hochwart has reported 7 similar cases in which he suspected the paralysis to be caused by the effect of toxins reaching the nerve from the mouth by way of the tooth socket. In this case where only one-half hour elapsed before the onset the author assumes mechanical injury to the facial nerve took place, possibly pressure behind the angle of the jaw when the mouth was widely open. It was uncertain whether the sense of taste was affected; if so, Schuster would attribute it to the neuritic process ascending to the chorda tympani.

THE AUDITORY NERVE.

Menière's Syndrome Without Deafness has received the sanction of no less authority than Frankl-Hoch-

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(5) Neurol. Centralbl., Dec. 1, 1910.

wart,[6] the author of a fundamental book on this subject which appeared in 1895. At that time he considered deafness an essential feature, but when the second edition appeared in 1906 he had observed undoubted vestibular vertigo without deafness, and others (especially Ruttin, Barany, and Voss) have reported similar cases. His new case is that of a woman of 37 years of age without previous ear disease who was taken with a cold and laryngeal catarrh in the middle of August, 1908. She had only occasional slight dizzy sensations until on August 29, when she became quite exhausted following a bath after having played tennis in very hot weather. At 8 p. m. slight left-sided tinnitus set in, followed in an hour by violent vertigo, increased tinnitus, and great fear. She had to lie with the eyes shut and head immobile. Vomiting was frequent. This condition continued with unabated severity until the end of September, when the tinnitus ceased but moderate vertigo persisted for a few months, at the end of which she recovered completely.

There was no impairment of hearing and no sign of any organic nervous lesion. No nystagmus or other cranial nerve symptoms existed. No evidence of leukemia, arteriosclerosis, nephritis or syphilis was found. The treatment consisted in the use of bromids and iodids, together with warm foot-baths. The author considers the case a typical one of Menière's disease with characteristic apoplectiform onset and no evidence whatever of disease outside the vestibule. Not even a neurosis such as hysteria, migraine, or neurasthenia was present, a fact of importance in view of the existence of a functional "pseudo-Menière syndrome." [For classification of all the possible causes of this syndrome see the *Practical Medicine Series,* 1910, Vol. X, p. 159.]

Lumbar Puncture in the Treatment of Aural Vertigo has been practiced by Putnam and Blake and the results related by the former to the *American Neurological Association,* as follows:[7]

"I base my remarks on the treatment of aural vertigo

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(6) Wien. med. Wochenschr., Oct. 29, 1910.
(7) Abstract in Boston Med. and Surg. Jour., Aug. 24, 1911.

by means of lumbar puncture upon the observations of 16 cases studied by Dr. C. J. Blake and myself. It is now about nine years since Babinski's observations on this subject were first published, and five years since the first cases of this series were observed. Babinski's interest in this matter grew partly out of his studies into the nature of artificial galvanic vertigo (with nystagmus and inclination of the head) in normal subjects, and it is of interest to note, as a sign that some change in the functional excitability of the labyrinth is brought about by lumbar puncture, that after the withdrawal of 15 c.c. to 20 c.c. of cerebrospinal fluid the reactions of the labyrinth to the galvanic stimulus were found to be no longer what they had been before. This applies, at any rate, to cases where these reactions had become changed in consequence of disease. Since Babinski's first communication a number of studies have been made, both by him and others, mainly in France, but also in Germany, and results have been obtained which, in general, corroborate his statements. The experience of Dr. Blake and myself has been of just the same kind with that of the other physicians. In brief, it may be said that the best cases are those where the symptoms do not indicate any very considerable disorganization of the labyrinth or any high degree of middle-ear disease, but rather an increase in functional excitability. Sometimes the favorable result is obtained at once, sometimes only after some days. Occasionally a second puncture is required. The amount withdrawn is usually 15 to 20 c.c. The only untoward result thus far observed is headache, which may last some days or even a week or more. Good results are obtained in a considerable proportion of the cases."

THE SPINAL NERVES.

INTERCOSTAL NEURALGIA.

L. M. Pussep[8] of St. Petersburg has practiced injections of alcohol into the intervertebral foramina in cases of simple intercostal neuralgia as well as in cases

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(8) Archiv. f. Psychiatrie, Vol. 48, p. 691

of the girdle pains of arthritis of the spine (Bechterew's form). The needle is entered perpendicularly one finger's breadth to the side of the spinous process. Four to 15 minims of a 1 per cent. solution of stovain in 90 per cent. alcohol are injected into each nerve affected, which in the case of spondylitis may number as many as 10. The injections are generally followed by anesthesia which is marked for 2 or 3 days and disappears entirely after 1 or 2 weeks. In cases of neuralgia 2 or 3 injections of 15 minims each generally suffice, but in spondylitis a larger number is required. Of 8 cases of intercostal neuralgia, 4 had relief after the first injection and the pain did not return within 6½ months during which the patients remained under observation. In 2 cases the pain subsided only after a third injection; one patient refused further treatment and in another case the result is unknown. Of 5 patients with spondylitis and rigidity of the spine, 3 showed marked improvement. When seen five to ten months after the treatment they were free from pain and able to work. One patient was considerably improved, and in the fifth one treatment had to be discontinued on account of vertigo and fainting attacks following the injections. [Injections of normal salt solution have also been made in intercostal neuralgia in both the simple and symptomatic forms. I succeeded in relieving severe intercostal pain in a case of aortic aneurysm with erosion of the ribs by injection of salt solution. In a case of intercostal neuralgia of 40 years standing with involvement of about six nerves on one side, several injections of salt solution gave only partial relief while subsequent injections with 90 per cent. alcohol completed the cure. It is too early to state whether the relief will be permanent.—P. B.]

SCIATICA.

Relaxation of the Sacro-Iliac Joints as a Cause of Sciatica and Backache is the title of a very lucid discussion by Robert L. Pitfield[9] who maintains that disease of this joint is the most frequent cause of pain in the back and of so-called sciatica. The sacro-iliac joints are true joints, with synovial membranes, and being vertical in the upright position, they are more unstable than any other joint. They move during every large motion of the trunk and relax during labor and menstruation. The upper two trunks of the sacral plexus and the gluteal nerves cross these joints and are prone to compression or stretching in case of abnormalities of the joints. The joints themselves possess nerves which may be the seat of local pain and tenderness. By far the most common pathologic condition is relaxation or luxation. Prolonged stooping is apt to cause strain of these joints and many laborers combat this by wearing a belt about the pelvis just above the trochanters. Mild strain may be caused by automobile, street car or horseback riding or lying in hammocks or beds with weak springs. Subluxation may follow direct trauma or slipping or heavy lifting.

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[9] Am. Jour. Med. Sciences, June, 1911.

The diagnosis may be made by various tests. Thus, when the patient rises from a low chair "he holds his back stiff and does not bend gracefully, but pushes himself up with his arms and finally with much effort staggers to his feet. His back may be arched and he stoops often when standing." The lumbar spine is frequently straight instead of possessing the normal lordosis. Grasping the crests of the ilium and separating them or drawing them together causes sharp pain. When the patient lies face downward on the bed, hyperextension of the leg causes acute pain in the joint. Preternatural mobility of the pubic joint caused by the relaxation of the sacro-iliac joints may be detected by having the patient lie face downward and slipping one hand under the patient, firmly pressing the pubic bones while the leg on the affected side is moved up and down with the other hand. Relief from pain by certain positions is another sign, and may be obtained by restoring the normal lumbar curve by pillows under the back or by lying face down between two chairs. Finally *x*-ray examination is helpful although difficult. The pubic bone on the affected side is apt to be higher than its mate and the whole os innominatum appears as if thrust slightly upward and backward, the pubic portion as a lever.

"The symptoms are first of all, backache, especially when lying on the back or on stooping, tender sacro-iliac joints, pain in the sciatics and buttocks, paresthesias in the feet and knees; often lameness and even atrophy of the leg or legs; inability to rise out of low chairs and out of bed quickly; resting in chairs or seats with the back supported with cushions. In women it is worse during menstruation. The uterosacral ligaments are inserted in the region of the joint, and these become congested during menstruation and cause relaxation. It is a common cause of backaches after operations. It may invalid people by reason of the pain."

The histories of 8 cases are cited and the diagnosis was supported by the good results of treatment directed toward the restoration of the normal position of the pelvic bones. In mild cases the luxation may be reduced by having the patient lie face downward between two chairs or with a pillow under the lumbar spine. To maintain correct position a belt nine inches wide may be made encircling the pelvis from the trochanters up to the iliac crests. Perineal straps are necessary to keep it in place. Adhesive straps may be used also.

The subject of sacro-iliac relaxation is also taken up at length by Meisenbach[1] who analyzes 84 cases. He too maintains that the sacro-iliac joint is a true joint normally admitting of some motion. It is subject to strain and subluxation as well as to the ordinary joint diseases. Sciatic pain often results from subluxation. He lays stress on prophylaxis as regards obstetric practice because relaxation of this joint is a frequent complication of difficult forceps deliveries and especially of symphysiotomy or pubiotomy. He also treats the condition by applying a well-fitting bandage about the pelvis.

Treatment by Saline Injections. This method, the discussion of which is generally credited to Lange of Leipsig who published an article on the subject in 1904, seems to have been quietly practiced in Glasgow for

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(1) Surg., Gyn. and Obstetrics, May, 1911.

about five years prior to that time. Archibald G. Hay[2] in reporting 10 cases makes the statement that his first case was injected 2½ years before the time that Lange, according to his paper, made the first injection, namely July, 1902. One of Hay's patients had been confined to the house with sciatica every winter for periods varying from a few days to many weeks. He was injected eleven years ago and since then has never lost a day's work. Hay describes his method as follows:

"With regard to the technic of the injection, I now inject at the sciatic foramen or at the gluteal fold, according as pressure causes greater pain at the one point or the other. To find the foramen, I draw imaginary straight lines from the posterior superior iliac spine to the tip of the great trochanter and to the middle of the ischial tuberosity, bisect the angle contained by these lines, and measure 2½ inches along the bisecting line. At the gluteal fold the nerve lies midway between the trochanter and the tuberosity. To ascertain whether the needle has penetrated into the nerve, I press the plunger of the syringe gently so as to expel a few drops of the solution. If the needle is in the nerve the patient experiences a sensation as if something were trickling down within the leg to a variable distance, sometimes only to the middle of the thigh, sometimes as far as the heel."

Hay[3] wrote a paper on the same subject 4 years ago.

The Injection Treatment of Sciatica is still on trial, and while its value in certain cases is unquestioned the point of injection and choice of solution have not been agreed upon and, worst of all, no one has satisfactorily explained the reason for the striking relief occasionally obtained. These problems have been discussed in previous volumes of this series (*Practical Medicine Series,* 1909, Vol. X, p. 205; 1910, Vol. X, p. 167). Fortunately we are receiving data from surgeons who are endeavoring to produce local anesthesia by nerve injections in patients who are in no condition for either general or spinal anesthesia.

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(2) Glasgow Med. Jour., April, 1911.
(3) Glasgow Med. Jour., May, 1907.

Recently, Löwen,[4] of the Surgical Clinic in Leipzig, has perfected a method which he claims can be applied to the treatment of sciatica though it was primarily devised for the purpose of permitting surgical operations in the area supplied without additional anesthesia. He uses a 1 per cent. novocain-sodium bicarbonate-adrenalin solution which he injects at two points after previous careful palpation of the buttock. Success in reaching the nerve can be expected only in lean subjects. [Very unfortunate for the many well-nourished victims of sciatica.—Ed.] The one point is 2 cm. outside of the tuber ischii, the other 3 cm. inside the great trochanter. The needle is entered perpendicularly at the first point, the depth indicated by the previous palpation, and 20-30 c.c. injected. This is supposed to strike the posterior tibial division of the nerve. The needle is partly withdrawn, directed more outward and more fluid is injected. Then the needle is entered at the second point and directed a little inward. The solution is injected at different levels in order to increase the chances of reaching the nerve. He does not believe that this solution or plain salt solution acts merely mechanically by separating the nerve bundles, because this does not explain the benefit derived from epidural injections, but believes the solution diffuses along the nerve trunk and may reach even the spinal ganglion or the cord.

In another paper on extradural injections in the sacral canal for surgical purposes the following directions are given for the preparation of the solution: Sodic bicarbonate, 0.15, sodic chlorid, 0.1, and novocain, 0.6 grams are rubbed up together and dissolved in 30 c.c. of distilled water and fast brought to the boiling point. Prolonged boiling disintegrates the novocain. The solution is cooled and 5 drops of 1 to 1,000 adrenalin solution are added. For the sciatica injection a larger amount of solution of one-half this strength should be made.

Radiotherapy in Sciatica was found to succeed in 4 cases where rest, salicylates, galvanism, and other treat-

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(4) Deutsche Zeitschr. f. Chir., 1911, p. 252.

ment had failed, by Babinski, Charpentier and Delherm,[5] and Rose has had a similar experience. The lumbo-sacral region of the spine was exposed to the *x*-rays and in 2 cases also the thigh and calf. Improvement set in after two or three treatments of ten minutes each.

MULTIPLE NEURITIS.

Alcoholic Neuritis in a Child Simulating Muscular Dystrophy. A boy, 8 years old, observed by H. Eichhorst,[7] had been suffering for 2 years with progressive weakness of the muscles of the lower extremities and back. There was pseudohypertrophy of the muscles, and the boy got up from the floor in the manner typical of cases of muscular dystrophy. Pressure on the nerve trunks did not reveal abnormal tenderness, and the knee-jerks were lively. It was accidentally discovered that the boy secretly drank strong liquors, and even the alcohol from alcohol lamps. He was strictly watched and he recovered in eight months. The case is remarkable on account of the increased reflexes, absence of tenderness and presence of pseudohypertrophy. It teaches the lesson that one must be very skeptical when hearing reports of recoveries from muscular dystrophy.

The Treatment of Multiple Neuritis. Robert Bing[8] has written a monograph on the pathogenesis, diagnosis and treatment of this disease. In an ordinary case, such as one of the alcoholic forms with both motor and sensory involvement, Bing outlines the treatment as follows: First of all the patient must be placed in the correct position in bed. To avoid equinovarus position of the feet the weight of the bedclothes must not rest on the feet, but a thin layer of cotton batting may be placed on the feet to keep them warm. To keep the feet as much at right angles as possible a support placed against the soles should be made. It may be improvised by wrapping a cigar box with wadding. It is generally

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(5) Revue Neurologique, Apr. 30, 1911.
(7) Correspondenzbl. f. Schweizer Aerzte, 1910, No. 30.
(8) Med. Klin., 1911, Supplement.

recommended to keep the legs extended at the knees to avoid flexor contracture, but the author has seen to harm come from allowing a small pillow under the knees, as even a slight flexion diminishes the pain considerably by lessening the tension of the nerve trunks. The legs may be placed in moderate abduction between sand-bags. To avoid overstretching of the extensors the hands must not be allowed to stay in the wrist-drop position. A well-padded posterior splint, if tolerated, will prevent this, and will promote the return of power in the extensors.

Psychotherapy is in order from the start as the idea of being paralyzed frightens the patient greatly, and the good prognosis must be thoroughly explained and reiterated. The alcohol must be withdrawn at once except in cases of threatened collapse from weakness of the heart, or in case of threatened delirium tremens when the withdrawal should be less abrupt. Abundant but non-stimulating food should be given, preferably a largely vegetable and milk diet with abundance of vegetables and fruit. The patient should be fed frequently, even every hour, as large meals are generally not well tolerated.

In the early stages measures to relieve the usually severe pain are necessary. Pyramidon in doses of 5 to 8 grains is generally most satisfactory but a change is sometimes necessary, and one of the following mixed powders will usually be satisfactory: (1) Acetanelid, gr. 3, phenacetin, gr. 2, quinin valerianate, gr. 1; (2) phenacetin, gr. 10, acetanelid, gr. 5, codein, gr. 2/3; (3) exalgin, gr. 2, caffein citrate, gr. 1, phenacetin, gr. 3, antipyrin, gr. 6; (4) aspirin, gr. 7, lactophenin, gr. 7, caffein citrate, gr. 2.

In the evening a combination of an analgesic and a hypnotic is often desirable such as pyramidon, gr. 5 and veronal, gr. 7; or 5 gr. each of lactophenin and trional. On account of the intensity of the pain hypnotics alone almost never succeed. The following mixture is often very useful:

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Potass, bromid	10.0	(ʒiiss)
Chloralis hydratis	5.0	(gr. lxxv)
Codein phosph	0.4	(gr vi)
Antipyrin	3.0	(gr. xlv)
Aquæ Menth, pip. q.s. ad	150.0	(℥v)

Misce et signa: Tablespoonful in the evening.

The author has never been compelled to use hypodermics of morphin in multiple neuritis. In severe cases he would advise the new opium derivative pantopon.

After the most severe spontaneous pains have passed, applications of heat should be commenced. A hot-air apparatus of a kind which can be placed on a bed without disturbing the patient is very useful both in relieving pain and in furthering elimination of toxic material by promoting diaphoresis. The sweat should not last more than ten or fifteen minutes, and the pulse must be carefully watched. At this stage the analgesic remedies mentioned may be withdrawn or given only at night, or they may be replaced by aconitin or colchicin. Massage should not be given during the acute stage and no stimulating electric treatment, but stable galvanic treatment is useful, the anode being placed over a tender area and a weak current—3 to 5 milliampères—used The current should be closed and opened very gradually. Analgesic liniments applied without rubbing may be useful and on skin areas, the seat of marked paresthesias, pieces of flannel saturated with the following solution may be applied: menthol, 1 part; guaiacol, 1 part; alcohol, 20 parts.

When the pains have subsided and the motor symptoms no longer progress, the reparative processes must be energetically aided. The patient may be helped to sit up but every overexertion must be avoided. Electric stimulation of the muscle by means of galvanic interruptions should be used. That pole should be used on the muscles which produces the best contractions. As a rule this is the positive pole, because reaction of degeneration generally exists. Faradic treatment is generally useless since the paralyzed muscles do not react to it. On the other hand the use of the faradic brush on anesthetic skin may be useful. Mild massage and passive movements are useful. Strychnia is of value as it increases the reflex irritability of the anterior horn cells. During convalescence a course at some watering place may be of value.

NEUROFIBROMATOSIS.

Neurofibromatosis (Recklinghausen's Disease) with the Clinical Picture of Amyotrophic Lateral Sclerosis. A case is reported by Peusquens [9] who has found only one similar case in the literature, namely that of Zinna, also recorded by Adrian.[1] Peusquens' patient was a boy, 17 years old, who developed weakness of the right arm at 15, a year later also weakness of the right leg. When examined in September, 1908, there were cherry-sized tumors of the skin of the abdomen, chest and forehead. The patellar and plantar reflexes were present, the abdominal and Achilles reflexes absent. The right arm and leg were paretic. There was no sensory disturbance. The right extremities gradually became weaker and more atrophic, and slight atrophy and weakness also appeared on the left side. The paretic muscles gave a partial reaction of degeneration. Toward the end, bilateral patellar clonus and the Babinski sign appeared, together with slight left-sided ptosis and impaired vision in the left eye, but there were no fundus changes.

At the necropsy tumors were found surrounding the left optic nerve, at the foramen rotundum, and in both internal auditory meati, the latter firmly adherent to the auditory nerves. There was also tumor-like thickening of the right motor oculi and trigeminal nerves, the left facial and right hypoglossal nerves. On the left side a cherry-sized tumor in the cerebello-pontine angle was continuous with that mentioned at the auditory meatus. There were numerous small tumors of the roots of the spinal cord as well as of the cauda equina and of the sciatic, peroneal, anterior tibial and cervical nerves. All

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(9) Deutsche Zeitschr. f. Nervenheilk., Vol. 40, p. 56.
(1) Beitr. zur klin. Chir., 1901, Vol. 31.

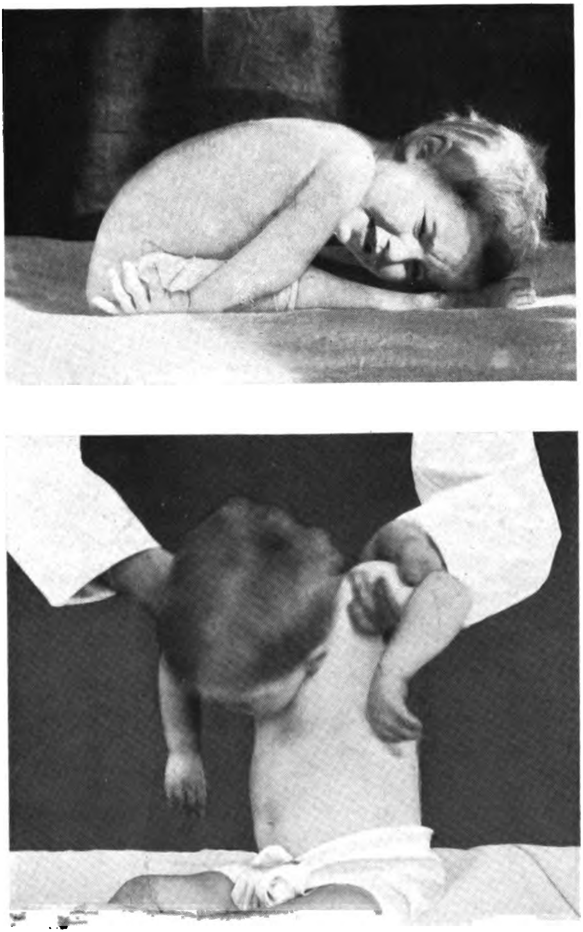

PLATE X.

Amyotonia congenita. Showing atonic weakness in muscles.—Griffith and Spiller. (Page 185.)

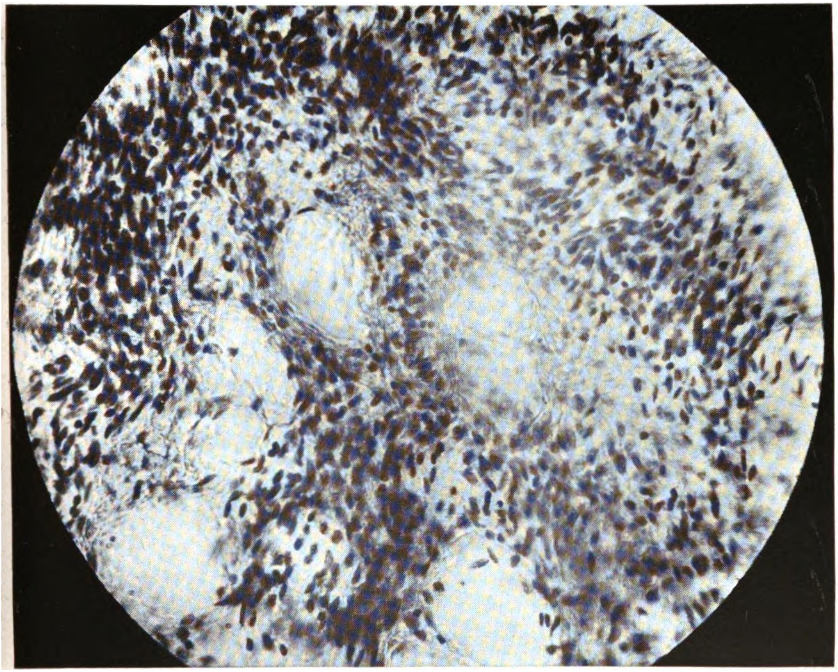

PLATE XI.

Amyotonia congenita. Section of calf muscle showing cellular infiltration and increase in sarcolemma nuclei.—Griffith and Spiller. (Page 185.)

of these tumors as well as those of the skin were genuine neurofibromata. As the symptoms in the case had led to the clinical diagnosis of amyotrophic lateral sclerosis the lesson here taught is that when cutaneous neurofibromata are found in a patient presenting the symptoms of this disease the possibility of central neurofibromatosis must be borne in mind.

DISEASES OF THE MUSCLES.

AMYOTONIA CONGENITA.

This disease, first described by Oppenheim and named by him "myatonia congenita" was fully considered in the *Practical Medicine Series,* 1910, Vol. X, p. 179: Now a new case with necropsy is reported by Griffith and Spiller.[2] It may be recalled that the first necropsy report ever published was by Spiller in 1905. The number of reported cases is now 60, with 6 necropsies. The case of Griffith and Spiller is that of a boy who was 15 months old when first observed in December, 1909. The parents were drunkards. The boy had general flaccid paralysis from birth, and never learned to use his legs or handle objects. His limp appearance may be judged from Plate X. He could not even sit up or hold his head erect. Only very slight movements of the arms and legs were possible, and the chest expansion was diminished. There was no evidence of rickets and no wasting of the limbs, but the knee-jerks were absent, the joints hypermobile, and the muscles failed to respond to either faradic or galvanic currents. He gradually gained strength to the extent of holding the head erect but his general health was poor and he died of pneumonia at the age of two years.

At the necropsy the subcutaneous fat was found to be markedly increased while the muscles were atrophic, pale, and soft. Thus, in the forearm, there was merely a layer of muscle one-eighth of an inch thick around the bone, but the size of the forearm was about normal on account of the large amount of fat. The anatomic

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(2) Amer. Jour. Med. Sciences, August, 1911.

diagnosis was: atrophy of the muscles, with general fatty infiltration; bronchopneumonia; cloudy swelling and congestion of the kidneys; slight cloudy swelling of the liver.

Histologic examination of muscle from the forearm showed great atrophy of muscle fibers, much more marked in certain bundles than in others. The atrophied fibers retained their transverse striation, and showed an excessive number of sarcolemma nuclei. Fatty degeneration was demonstrable in some muscle fibers. In muscle from the back the atrophy was less intense. In the calf muscle the changes were very intense, with great increase in fibrous tissue and in sarcolemma nuclei [Plate XI]. The intramuscular nerve fibers were much degenerated. The muscle spindles appeared to be normal. The brain was unusually large, being of adult size. It weighed 1,542 grams after it had been one week in formalin. The cord was relatively rather small, the anterior roots small, the posterior ones of good size. Several of the anterior roots examined showed degeneration, as did also the posterior tibial nerve.

This case emphasizes the resemblance of the muscle changes in this disease to those of muscular dystrophy and the Werdnig-Hoffmann type of muscular atrophy. The whole literature is thoroughly reviewed by Cassirer in the new *Handbuch der Neurologie,* edited by Lewandowsky and also by Griffith.[3]

MUSCULAR HEADACHE.

Muscular Headache; Its Nature and Treatment. This is the title of an elaborate and systematic study by A. Müller,[4] who commences by referring to the descriptions of "indurative" headaches by Edinger in 1901 and by Auerbach in 1903, and to the earlier work of Henschen and other Swedish authors. [In a book published in 1881 Henschen[5] expressed the view, based on 140 minutely tabulated cases, that migraine is not

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(3) Trans. Amer. Ped. Soc., 1910.
(4) Deutsche Zeitschr. f. Nervenheilk., 1910, Vol. 40, p. 235.
(5) Studier öfver Hufvudets Neuralgier. Upsala, 1881.

a clinical entity but is a form of neuralgia of branches of the trigeminal and occipital nerves, brought about by an inflammation of rheumatic nature, and that massage is the best treatment.—ED.]

Müller does not approve of the term "indurative" headache (*Schwielenkopfschmerz*), as it suggests infiltration or other new formation of tissue, while he looks upon the apparent "induration" as evidence of muscular contraction, "hypertonus." He gives three reasons why Auerbach and other previous observers were misled to mistake the contracted muscle portions for inflammatory "infiltrations:" 1. They used improper or no lubrication of the skin in their examinations; 2, they examined their patients in the sitting position, while complete relaxation can be obtained only when the patient lies down; 3, they were not systematic in their examination. The hypertonus originates in minute, extremely hard and extremely tender nodules located at the bony insertions of the muscles. They cannot be felt until the muscle is thoroughly relaxed, and have never previously been described, as the nodules and infiltrations of other authors are merely the secondarily contracted muscle portions. The underlying condition is of "rheumatic" nature and consists of "latent chronic arthritis" of the cervical spine and the sternoclavicular and sternocostal joints. There is, however, no relationship between the degree of the joint disease and that of the muscular hypertonus. The essential cause of the joint disease is unknown, "constitutional," but the muscular contractions and resulting headaches are brought on by such exciting causes as physical or mental fatigue, excitement, indulgence in alcohol, changes in temperature and other atmospheric conditions.

The hypertonus never attacks one muscle only, but also its synergists and antagonists, and the corresponding muscle on the other side of the body with its synergists and antagonists. For this reason the whole musculature of the neck and occiput is always involved, the hypertonus arising as a result of irritation from three principal points: 1. The insertions of the musculi iliocostales cervicis in the angles of the ribs from the third to the seventh inclusive. 2. The articulations of the cervical vertebræ. 3. The sternoclavicular and the first sternocostal joints. The contractions resulting from this hypertonus in the neck and occiput causes a shortening of the neck, and lordosis. The lordosis in turn causes stasis in the internal jugular vein resulting in hyperemia of the scalp. The shortening of the neck further results in a displacement of the larynx toward the thorax. For this reason the thyroid becomes wholly or partly displaced into the thorax with resulting disturbance of its circulation and of the discharge of its secretion. Furthermore, the displacement results in a loss of the regulation by the omohyoid muscles of the flow through the internal jugular veins. The headache is partly the muscular pain itself located in the head and partly the result of the congestion of the scalp. The latter together with the functional disturbance of the thyroid are the causes of the cerebral symptoms which accompany the headache, notably the neurasthenic symptoms.

Müller considers the scope of this form of headache to be very large: "Every headache which is not caused by organic disease of the brain, meninges, skull, cervical vertebræ, eyes, nose, ears or teeth is muscular and depends on disease of the musculature of the head and neck. The headache following injuries to the head, and migraine are also muscular." According to him the only rational treatment is methodical massage of the diseased region for many weeks.

The same subject is discussed at length in a critical review by Rose[6] of Paris who agrees with Müller in adopting the term "muscular" headache in preference to "indurative" headache. While on the whole much impressed by the theories of Müller and the Swedish authors who preceded him, Rose as a neurologist naturally hesitates in including migraine in this group. Thus he cannot accept Müller's explanation that the scintillating scotomata so frequent in migraine may be explained by pressure of the affected superior oblique muscles on the eyeball, and the occasionally observed

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(6) Semaine Méd., Mar. 29, 1911.

hemianopia and paralysis by circulatory disturbances produced in the manner explained by Müller.

MYASTHENIA GRAVIS.

A Case With Necropsy is reported by Roussy and Rossi.[7] The patient was a girl 10 years old in the service of Pierre Marie. The onset was about nine months before death, with weakness of the extremities, every exertion causing undue fatigue. Later, a tendency to drooping of the eyelids toward evening appeared. Difficulty in mastication and deglutition also existed in typical manner, the patient having to rest several times during a meal. The pupils reacted normally, but after throwing light into the pupils ten or fifteen times the contractions of the iris grew weak and finally became almost imperceptible. As could be expected the muscles gave the so-called myasthenic electric reaction, that is, after a short faradization the muscles no longer contracted until given a brief rest. The patient died of broncho-pneumonia. During the last two weeks it had been necessary to feed her through a tube.

At the necropsy no gross changes of importance were noted aside from the broncho-pneumonia. The thymus weighed 5 grams; the adrenals together, 11 grams; the thyroid, 15 grams. On histologic examination the thymus showed intense congestion and lymphoid hyperplasia. The normal follicular arrangement and the Hassel corpuscles were absent. The thyroid showed some interstitial infiltration of lymphocytes. The adrenals and hypophysis showed no important change. The central nervous system was normal aside from slight dilatation and ependymal proliferation in the aqueduct of Sylvius. The striated muscles showed the usual round-celled infiltration which has now become recognized as a constant and characteristic feature of the disease. The degree of infiltration varied greatly in different muscles and in different portions of the same muscle. The heart muscle was not involved. The round cells were of the type of small lymphocytes

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(7) Revue Neurologique, Feb. 15, 1911.

as in all other cases reported. There were also parenchymatous changes in the muscles in the form of granular and fatty degeneration, loss of transverse striation and atrophy of fibers. [In spite of all that has been written on the relation of this disease to the parathyroids these organs were not examined.—ED.]

FAMILY PERIODIC PARALYSIS.

M. L. Gatti[8] adds one case to the few dozen reported of this strange familial affection which seems to predominate among the Jews of Eastern Europe. The patient had his first attack at the age of 15 years, then for a time one attack each month and later one or two a week. The attacks came on when the patient had been lying down or sitting for some time, and commenced with palpitation and a general feeling of weakness. This was followed by paralysis of the extremities which began in the proximal portions and generally affected the legs before the arms. The trunk muscles also were involved but not those innervated by the cranial nerves, except that on rare occasions the patient had difficulty in opening the mouth. The sphincters were not involved but the heart muscle appeared to be weak during the attack as symptoms of acute dilatation occurred. The tendon reflexes were diminished or lost during the attack and the same was true of the galvanic, faradic and mechanical irritability of the nerves and muscles. Sensation and the pupillary reflexes were not involved. The patient usually perspired freely. The duration varied from fifteen minutes to two days. The return of motility in the muscles was in an order reverse to that of the onset. In the intervals the patient was entirely well. The patient's father, grandfather, great-grandfather, three uncles and one aunt suffered from the same disease.

As the author well puts it, this disease presents for our solution the double problem of its site and its cause. As may be expected, that popular shibboleth, auto-intoxication, is brought up. Myatonia congenita has been

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(8) Gaz. des Hôp., Aug. 8, 1911.

defined as the opposite of the equally inexplicable Thomsen's disease, but Gatti justly claims this position for myasthenia gravis. As to site, the author favors the muscular system, and places the disease in the group of hereditary myopathies. [A relatively large number of cases has been reported in America, *e. g.,* by Burr, Putnam, Knapp.—Ed.]

MISCELLANEOUS.

Osteo-Arthritis of the Spine as a Cause of Compression of the Spinal Cord and its Roots is the title of a paper by Pearce Bailey and Louis Casamajor.[9] Five cases are reported, all of which presented symptoms of compression.

These authors do not recognize the distinctions between the various forms of arthritis of the spine as made by others but believe "that the pathology of osteo-arthritis is still too obscure to permit sharp clinical divisions and feel that the study of the subject can be better advanced by leaving the doors wide open. A disease which most commonly originates without known cause or which may be the result of gonorrhoea, syphilis or of other infectious diseases or trauma, one whose lesions may involve a small part of a single vertebra or the whole spinal column, is hardly one to submit gracefully to clinical restrictions."

Treatment. The authors admit that the results are not dazzling but mention as useful local measures counter-irritation, immobilization and the relief of pressure. "Counter-irritation may be in the form of deep massage of the spine and the actual cautery; hot-air baths have been of little use in our hands. Immobilization, by means of a plaster jacket, seems particularly useful in subacute cases or when there is marked deformity. The operative indications are too infrequent to permit any general rules, except that operation for the relief of pressure on the cord in this disease is not contra-indicated, and may result in great benefit."

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(9) Jour. Nerv. and Ment. Disease, October, 1911.

"**Rhizomelic Spondylitis is a Clinical Entity**" is the thesis defended by Nicolas Eldaroff[1] in a lengthy article containing a report of 16 clinical cases and 4 necropsies. Fourteen of the cases were typical of the disease described by Marie and called *spondylose rhizomélique.* On the basis of these 14 cases and the literature the author attempts to formulate the symptomatology of the affection as follows:

1. The male sex is almost exclusively affected, only 1 of his cases and 1 in the literature being in women.
2. The onset is usually between the ages of 20 and 40 years.
3. The duration is 10 years or more.
4. The occupations of the patients were very varied.
5. The general health is good.
6. The essential features are *the pains and immobility of the spinal column, hip- and shoulder-joints.* The reciprocal relation between these symptoms constitutes the clinical picture of the disease.
7. The onset may be acute or subacute, or more frequently chronic. In the acute form the disease begins immediately or a year or more after the operation of the noxious agent (see etiology below) by acute pain in the whole spinal column or only in a certain portion, most frequently the lumbo-sacral, with radiation of the pain to the hip-joints. More rarely the pain commences in the neck, pelvis or knees. There is no swelling, redness of the skin, or fever. The pain is aggravated by motion, and after a few weeks or months it disappears, leaving the affected region immobilized. In the subacute form the onset is similar but the pain less severe.

In the chronic forms the onset is extremely insidious over a course of several years. Only slight pain in the regions mentioned is noticed and simultaneously limitation of motion progresses until complete ankylosis is established. In very rare cases there is no pain at all.

8. The onset of the ankylosing process probably coincides with the appearance of the first pain, the latter being a symptom of the former.

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(1) Nouv. Icon. de la Salp., Vol. 24, p. 121.

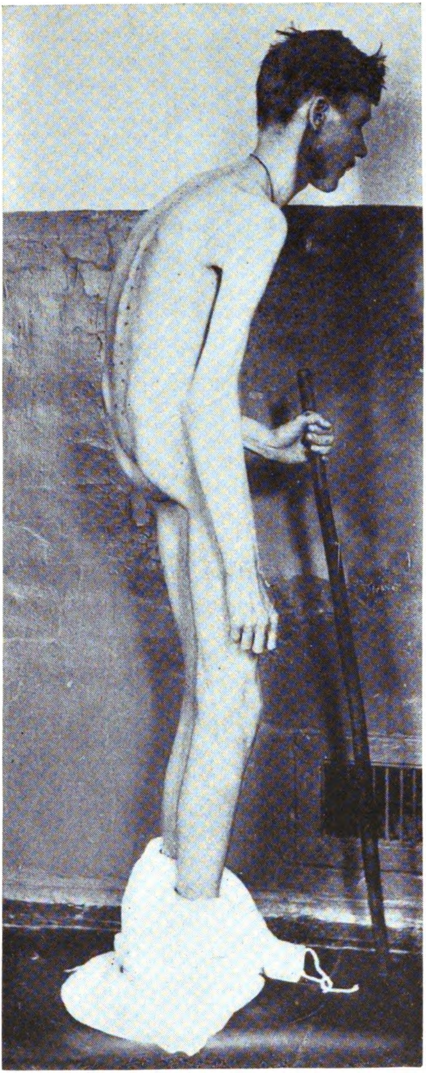
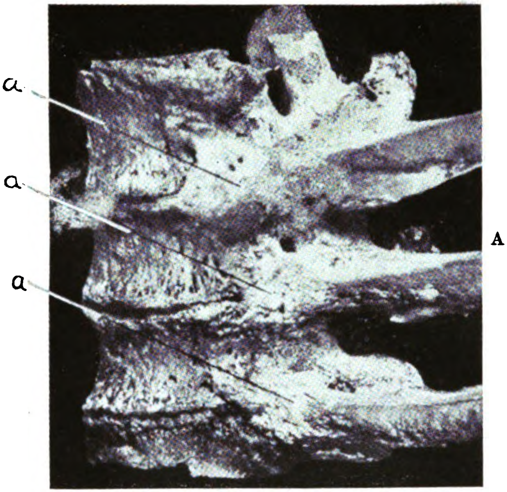


PLATE XII.

Rhizomelic spondylitis. Showing attitude of patient with ankylosis of spine.—Eldaroff. (Page 192.)



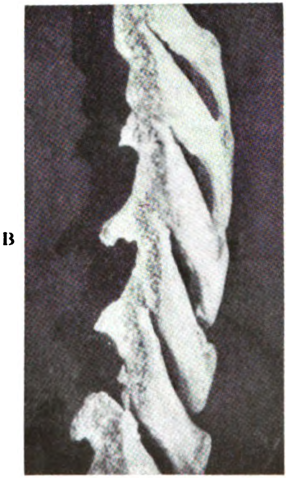


PLATE XIII.

Rhizomelic spondylitis.

A. Lateral view of ankylosed vertebræ.
a. Ossified costovertebral ligaments.

B. Fused spinous processes.—Eldaroff. (Page 192.)

9. The principal seat of the affection is the vertebral column and the "roots of the extremities." The ossifying process may extend from below upward or *vice versa.*

10. After the initial pain there may be occasional recurrences of pain but the principal symptom has become the immobility of the spinal column which may involve the entire length (8 of the 14 cases), or only the dorso-lumbar region (6 cases).

11. There is a kyphosis of the dorsal or dorsal and lower cervical regions, usually with a large radius. Plate XII.

12. The normal lumbar lordosis was flattened out in all of the 14 cases.

13. In all of the cases the chest was sunken, flat and immobile during respiration which is of the abdominal type.

14. The abdomen is divided by a horizontal fold 3 cm. above the umbilicus into 2 portions, the upper being flat, the lower projecting forward.

15. The hips and shoulders were more or less involved in all of the cases, there being either slight limitation of motion with joint crepitus or complete ankylosis.

16. The attitude of the patient depends on the degree and localization of the ankylosis or pain. The ankylosed portions are fused into one bony mass which is more easily broken than bent.

17. Aside from the vertebral, hip- and shoulder-joints all of the joints were uninvolved except the elbow in one case and the knees in one case, the motions of which were slightly limited.

18. A crackling noise is nearly always present in the affected joints as long as there is any possibility of motion.

19. A characteristic feature is the nearly absolute absence of bony deposits and deformities of the bones (aside from the kyphosis as described).

20. The pain which is as characteristic of the disease as the ankylosis is most intense in the regions of the spine not yet completely ossified. The pain is not spontaneous but is brought on by motion.

21. There is no tenderness on pressure of the spine.

22. In one of the 14 cases tabes also existed. In the others there was no evidence of lesions of the nervous system.

23. In nearly all the cases there was slight atrophy and rigidity of the muscles in the region of the shoulder and pelvis; sometimes also a wasted condition of the entire upper or lower extremities. Reaction of degeneration was not observed.

Pathologic Anatomy. Osteoporosis of the vertebræ, bony ankylosis of the small vertebral joints, and ossification of the ligaments of the spine are three main features. The most characteristic one is the complete fusion of the affected vertebræ as is illustrated in Plate XIII, from one of the author's cases. The ossification also involves the ligaments which connect the vertebræ and the heads of the ribs as well as the supraspinous ligaments. Microscopic examination shows that the ligaments are not merely calcified but that they are really converted into true bone with Haversian canals. The spinal canal and the intervertebral foramina are of normal calibre. The intervertebral cartilaginous discs are largely converted into bone.

Differential Diagnosis. The chronic ankylosis of the spine described by Bechterew which Eldaroff considers identical with Marie's "heredo-traumatic kyphosis" involves the spine only, and is associated with a sharp kyphosis and numerous nervous symptoms such as paresthesias, pains, and slight atrophy of the muscles. These nervous symptoms are ascribed to chronic inflammation of the meninges and compression of the roots. The author believes that some cases of Bechterew's disease may possibly properly belong to the so-called hypertrophic pachymeningitis. The articular surfaces of the small vertebral joints are rarely deformed while they are ossified in rhizomelic spondylitis.

Spondylitis deformans or arthritis deformans of the spine causes marked deformities and the joints of the hands and feet are also involved. The intervertebral foramina are deformed. Chronic ankylosing rheumatism is characterized by the formation of a large number of osteophytes and nearly all of the small joints are involved. There is marked narrowing of the intervertebral foramina and the intervertebral cartilages are ossified while the ligaments are normal.

Treatment. Such drugs as salicylates, salol, potassium iodid and tonics containing arsenic and iron are recommended. Vesication, applications of iodin, the actual cautery, massage, electricity, and hydrotherapy are all useful.

Pellagra: The Changes in the Nervous System. This subject is discussed by Paul V. Anderson and William G. Spiller[2] who report 2 cases with histologic examination of the nervous systems. Both of the patients were inmates of the Western North Carolina Hospital for the Insane. The first patient was a woman, 22 years old, who four years previously had gastric disturbance during the spring and summer. The following spring the gastric symptoms returned, when she had persistent diarrhea with several watery stools a day. Later erythema of the hands, wrists and neck appeared and the palms became rough. The mouth and tongue were sore and there was profuse salivation. She improved in the fall but all of the symptoms mentioned reappeared in more severe form in the spring. In the fourth year of the disease she became disturbed mentally and she was restless, apprehensive, had hallucinations of sight and at one time threatened suicide.

She was admitted to the hospital in February, 1910. Salivation was profuse, the mouth was sore and she complained of severe pain in the knees and ankles. Appetite and thirst were excessive. There was a reddish-brown discoloration of the dorsal aspect of the hands and of the neck. The knee-jerks were exaggerated and the abdominal reflexes were absent, but the Babinski sign and ankle-clonus were not obtained. There was marked inco-ordination in the upper and lower extremities. The diarrhea increased and she developed marked muscular twitchings of the whole body. There were harsh breath sounds at the left apex, and six weeks before her death tubercle bacilli were found in the sputum.

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(2) Amer. Jour. Med. Sciences, January, 1911.

On examination of the nervous system the chief finding was a marked degenerative alteration of the cells of the anterior horns of the cord, the cells of the columns of Clarke and of the large motor cells in the paracentral lobules. The cell bodies were swollen, the nuclei displaced to the periphery, and the cell body showed marked chromatolysis or disintegration of the normal Nissl bodies. There was also diffuse degeneration in the posterior and anterolateral columns of the cord. (See Plate XIV.)

The second patient was admitted to the asylum in 1888 at the age of 40. For ten years he had been somewhat demented. In April, 1904, a note was made that he had an eczema-like eruption on his hands. His physical health gradually failed. In September, 1909, the dorsal aspects of the hands looked as if they had been badly sun-burned. He had diarrhea, the gait was staggering and the tendon reflexes increased. No doubt was felt as to the diagnosis of pellagra. In this case only a portion of the spinal cord was obtained for examination, and here also changes in the cells of the anterior horns and the columns of Clarke, similar to those in the first case, were found. There was also degeneration here and there both in the motor and sensory tracts.

As to the interpretation of the changes Spiller says: "I must conclude, so far as a study of these two cases permits, that pellagra does not always produce, if indeed it ever does produce, a truly systemic disease of the central nervous system; but that the degeneration is caused by some toxic or infectious substance affecting all parts of the cerebrospinal axis, producing cellular degeneration and diffuse degeneration of nerve fibers in the posterior and antero-lateral columns. It is not difficult to explain the mental symptoms when cortical degeneration is so intense as may occur in pellagra, and as is seen in the brain I have studied; and the insanity of this disease seems to be of a toxic or infectious character."

[A perusal of the various reports on the nervous symptoms and pathologic findings in cases of pellagra shows that the former are very variable and would lead to a suspicion of very extensive degenerations. However, in spite of great motor weakness, changes in the reflexes and inco-ordination it is rare to find definite cord degeneration while marked cell changes like those described by Spiller are common. One of us (P. B.) examined a number of cases of pellagra at the Peoria (Ill.) State Hospital and made a report which was incorporated in a paper by the late Dr. Hyde.[3] To quote:

"Fourteen men and 11 women were examined. Four men and 8 women presented sufficiently marked increase of the tendon reflexes to suggest the probability of some degree of degeneration of the pyramidal tracts. One of these men and 4 of the women had a more or less constant Babinski sign. One woman and one man presented signs of degeneration of the posterior columns alone, as most of the tendon reflexes were lost; others were greatly reduced; the woman also was extremely ataxic. One woman probably had a combined degeneration of the pyramidal and posterior tracts, as there was loss of tendon reflexes, with an inconstant Babinski sign on one side. No instance of local or multiple neuritis was observed. We could find no reason to believe that any of the cases with changes in the reflexes were instances of combined pellagra and tabes, spinal syphilis, multiple sclerosis, or other independent organic nervous disease."

Some of these cases were examined post-mortem. The cell changes were marked and of the kind described by Spiller. This cell picture is similar to that which has been called "axonal reaction," and is looked upon as secondary to degeneration of the efferent nerve fiber or axone.—Ed.]

Compressed Air Disease. (Caisson Disease.) This important occupational disease is not only of great scientific interest but of great economic importance, as the difficulty on the part of the human machine to accommodate itself to high atmospheric pressure and rapid changes in the same offers more serious problems than those of pure engineering. The explanation, first scientifically supported by the experiments of Paul

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(3) Amer. Jour. Med. Sciences, January, 1910.

Bert, is now everywhere accepted, namely that the symptoms are produced by the liberation of air, principally nitrogen, in the tissues when the pressure is reduced too rapidly. Hence the period of danger to the worker is not on entering the caisson nor while he is working but during the so-called decompression. It has been found that the longer the decompression the smaller the chance of any serious symptoms occurring. It is also universally accepted that the most effective treatment consists in "recompression;" that is the placing of the affected worker in compressed air as soon as symptoms appear, raising the pressure to that of the work-chamber and then lowering it very gradually.

Several foreign countries and the State of New York have passed laws giving rigid rules for the length of the period of decompression from various degrees of pressure. All of these laws prescribe uniform decompression, but recent extensive experiments carried out under the auspices of the British Admiralty have shown that time may be saved and the danger of the disease further lessened by "stage decompression;" that is, the pressure is rapidly reduced one-half while the further reduction is very slow. This method has been tried and found very satisfactory in the work on the construction of the Pennsylvania railway tunnel under the Hudson river.

It is interesting that a lucid and thorough discussion of the problems of caisson disease as met and combatted during this large undertaking comes from the pen of an engineer, Mr. Henry Japp.[4] In the report of the Commission on Occupational Diseases[5] appointed by the governor of Illinois, there is a review of all phases of the subject by Peter Bassoe, who also briefly reports 161 cases encountered during the investigation. The following summary was read by the author before the *Chicago Neurological Society:*[6]

"Some of the men examined had had their acute attacks many years ago; others during the present year. Of the 161 men, 87 had various affections of the ears

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(4) Transactions Amer. Soc. Civil Engineers, December, 1909.
(5) Published as a Monograph, Chicago, 1911.
(6) Jour. Nerv. and Ment. Disease, June, 1911.

causing permanent impairment of hearing in 65 cases; 141 gave a history of "bends," that is, severe muscular and articular pains; 34 had paralysis, most generally transient and affecting the legs, although 3 men have permanent partial paralysis of one arm, and 3 of both legs, and eleven present more or less chronic joint pain and stiffness. One of these men who developed an affection of the hip immediately after working his second shift in compressed air twelve years ago has been an invalid ever since and presents the typical *x*-ray picture of arthritis deformans. He had been in perfect health before these two exposures to compressed air. One man with signs of caisson myelitis had a spontaneous fracture of the patella eleven years after the acute attack which had consisted of numbness in both lower extremities followed by pain; 12 men now present signs of some degree of permanent cord disease; 13 were delirious or unconscious during the acute attack; 33 complained of vertigo as a prominent symptom; 6, of vomiting during the acute stage, and 11, of incontinence or retention of urine; 5 had numbness without paralysis; 6 had "blind staggers," that is, labyrinthine vertigo with nystagmus, and two had 'chokes.' Several men gave a history of large swellings of the soft part of the chest wall or in the vicinity of joints. Bassoe had not seen them at this stage but agrees with Heller, Mager, and Schrötter, that the swellings are due to vasomotor disturbance of central origin, not to local liberation of gas *(tumeurs gazeuses)* as has been claimed by French writers. He considers the nitrogen-bubble theory of Paul Bert fully proven by both the observations on human beings and the abundant experimental work recorded in the literature. The cases treated by immediate 'recompression' had fared much better than those not so treated."

Hermann von Schrötter,[7] of Vienna, who has occupied himself with this subject for years, in his recent monograph endorses the method of stage decompression, and describes the findings in the spinal cord of a diver

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(7) Le Travail dans l'Air Comprimé. Bibliothèque des Congrès Internationaux, Bruxelles, 1910.

who succumbed to the effects of rapid reduction of pressure. (See Plate XV.) In the report of the work done under the auspices of the British Admiralty by Boycott, Damant and Haldane[8] extensive experiments on animals are cited. Fig. 7 from their article well illustrates the formation of air bubbles in the substance of the spinal cord, and shows that the bubbles are formed chiefly in the white matter.

Paul Bert and other earlier observers believed that the bubbles in the cord to which most of the serious symptoms are one, were carried there by the blood and that the process is one of air embolism with resulting multiple foci of degeneration and necrosis. Recently, however, both experimental and anatomic studies have led many investigators to the conclusion that the local liberation of air plays a more important rôle

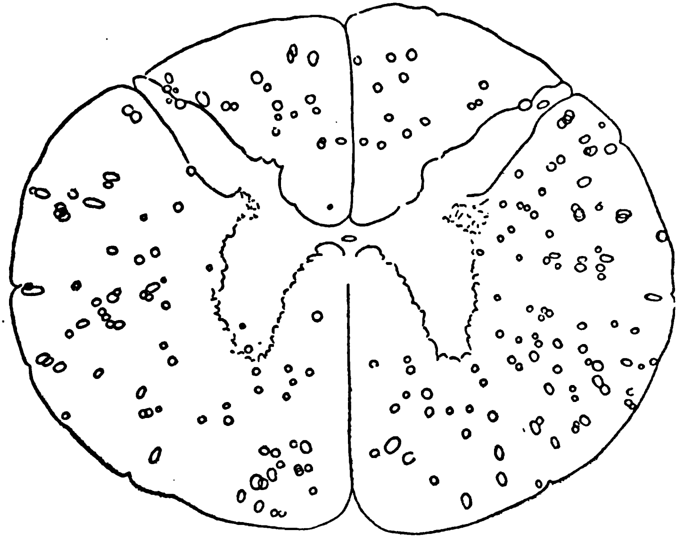

Fig. 7.

Air bubbles in spinal cord of goat exposed for one hour to air pressure of 75 pounds.

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(8) Jour. of Hygiene, 1908, Vol. 8, pp. 342-344.

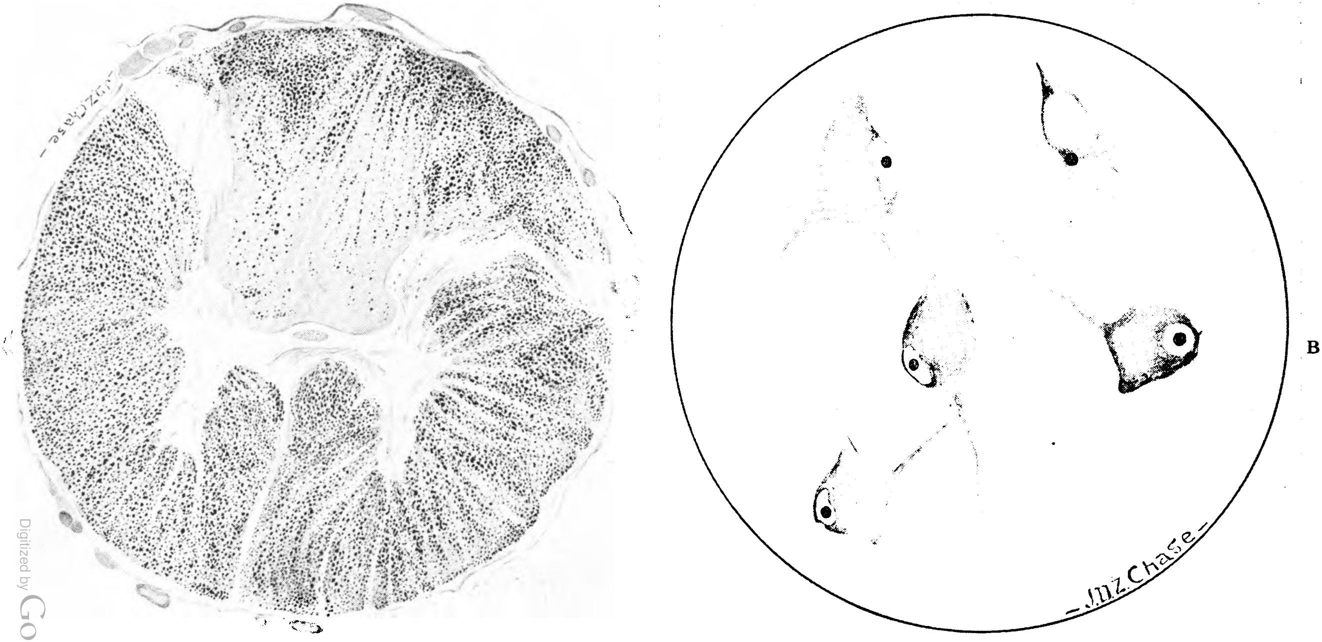

PLATE XIV.

Brain and Cord changes in pellagra.

A. Cross section of cord.

B. Ganglion cells from paracentral lobule of brain and from cord.—Anerson and Spiller. (Page 195.)

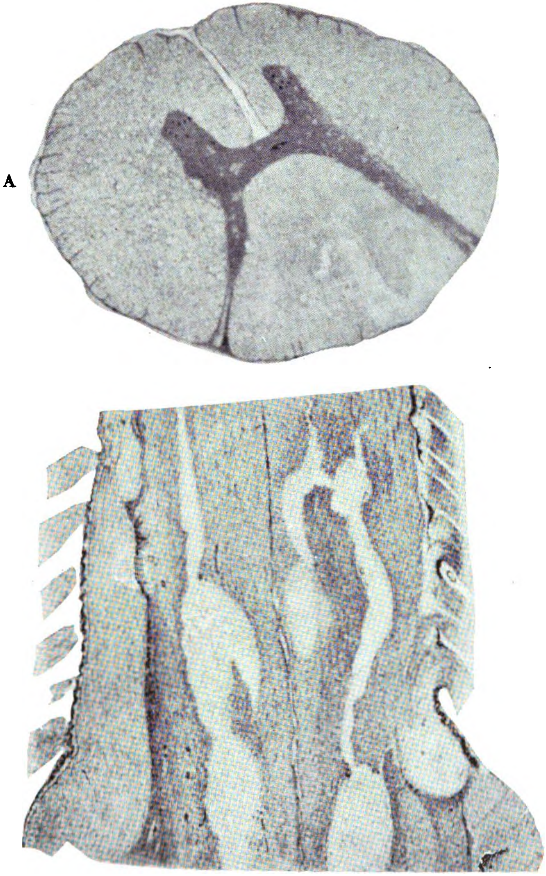

PLATE XV.

The spinal cord in "caisson myelitis."

A. Cross section.

B. Longitudinal section.—Schrötter. **(Page 199.)**

than embolism. Thus H. Quincke[9] calls attention to the special facility with which nitrogen and oxygen are taken up by fats and lipoid substances. His experiments show that olive oil, cod-liver oil and human fat absorb three to five times more nitrogen and oxygen than does water, and that in cerebrospinal fluid air is more readily taken up and more slowly given off than in more albuminous body fluids. In animals killed after exposure to high pressure it was found that the liberation of gas had occurred most freely in the skin, tissue clefts (especially fibrous and adipose tissue), serous cavities and joints, lymph, cerebrospinal fluid and blood capillaries. He believes that the severe pains in the limbs, the "bends," the most frequent symptom of caisson disease, are due largely to the local liberation of air bubbles in the subcutaneous and interstitial fat and in the muscles. The affinity of the lipoids of the cord substance for the gases of the air together with the known facility with which air bubbles form in the cerebrospinal fluid, according to Quincke better explain the frequency of cord affections than an exclusive air embolism theory.

Proper selection of men for work in compressed air is important, and no man should be allowed to enter high pressure without being passed by a medical examiner. J. Plesch[1] would exclude the following six groups: 1. Adipose individuals, because of the affinity of fats for nitrogen. 2. Victims of heart lesions, vasomotor weakness (neurasthenia, hysteria) or arteriosclerosis. 3. Victims of chlorosis and other forms of primary and secondary anemia. In such persons the tissues are liable to degenerative processes and are very readily lacerated by the liberated air bubbles. 4. Men with diseases of the central nervous system. 5. Men with edema or with nephritis without edema. Aside from the circulatory weakness, the increased volume of blood and tissue fluids in such persons magnifies the difficulty in disposing of an excess of nitrogen. 6. Victims of ear affections.

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(9) Archiv. f. exper. Pathol. u. Pharm., 1910, Vol. 62, p. 464.
(1) Berlin. klin. Wochenschr., 1910, Vol. 47, p. 709.

MENTAL DISEASES.

GENERAL CONSIDERATIONS.

Etiology of the Psychoses. J. W. Courtney,[2] in a paper entitled "The Youthful Psychopath," disagrees with the statement generally made that certain psychoses, notably paranoia and dementia precox and certain psychoneuroses, especially hysteria and psychasthenia, are due to factors which become active between the ages of puberty and maturity. As a pediatrist he has become convinced "that unmistakable evidence of the existence of these disorders is very often present at a tender age." He finds that clinical signs of their presence are always observable at the fifth year of life, or even earlier. To the victims of these manifestations he applies the term "youthful psychopath." He describes such an individual as follows:

"There is nothing absolutely distinctive about the bodily habit of such a child, although it is very apt to have a slender musculature, a narrow chest, scaphoid scapulæ, drooping shoulders and a vascular hypotonicity, with the vasomotor ataxia which so commonly accompanies this last-mentioned condition.

"In a certain percentage of cases there is a difference in the size of the pupils, most noticeable when the eyes are turned away from the light. The pupils are, nevertheless, always regular in outline, the response to tests of light and distance is prompt and alike in both eyes, and concentric limitation of the field of vision is invariably absent. The remaining sensorial, as well as the sensory, stigmata are also lacking.

"Owing to the vasomotor irritability the susceptibility to atmospheric conditions is very marked. If the

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(2) Bost. Med. and Surg. Jour., Feb. 16, 1911.

child happens to be out-doors when the weather is at all cold, its extremities quickly become mottled and painfully cold and numb. If it chances to go in-doors while in this condition, the heat of the house very soon causes a change from vasoconstriction to vasodilatation, with the result that the ears, cheeks, hands and feet tingle and grow uncomfortably hot and red.

"In many cases the enthusiasm for childish games of the out-door sort is not in the least abated. On the contrary, they are entered into with intensity and vehemence, but the emotional reaction is so marked that appetite is abolished and sleep is disturbed by vivid dreams. So slight, in fact, is such a child's power of inhibition that after a hard day's play it will toss and tumble about the bed all through the night, grind its teeth, cry out aloud or from time to time mumble disjointed phrases.

"In other cases a distinctly anti-social tendency is early exhibited. Where this exists, the child has no desire for out-door play with other children, but prefers to remain at home with a parent or nurse. Both of these types exhibit marked propensities to sleep-walking and similar automatic acts, and also to night-terror and bed-wetting. Furthermore, in both types, again, the eruption of a tooth or the onset of even a mild attack of one of the exanthemata is very apt to be ushered in by convulsions.

"Intellectually the psychopathic child is, as a rule, precocious to a marked degree, but unfortunately its intellectual nature is so completely overwhelmed by its emotions that, both in school and company, really dull children of its own age appear actually brilliant by comparison."

Fear is of particular importance among the emotions. "Fear, like the other emotions, has a very definite form of physical expression, such as pallor, cries, palpitation of the heart, muscular trembling and relaxation of the sphincters. With these are often associated some voluntary or semi-voluntary movements of a muscle or group of muscles which evidence an attempt on the part of the affrighted individual to escape from a terrifying object or situation. In the youthful psychopath certain of these semi-voluntary defense movements are habitual and constitute *tics*. The other phenomena are not habitual, but are frequently occasioned, to some degree at least, by various agents which tend to bring the fear-emotion to a crisis. These agents are many in number, but the most common are such natural phenomena as thunder and lightning, the noise of fire-arms, high places, crowded or solitary localities and so forth.

"The effect of fear upon character formation is equally striking and interesting. In the company of normal children or of adults not of its family, the youthful psychopath is shy and diffident to a marked degree. If its over-exalted sensibilities chance to be wounded by a child of its own age, it invariably has recourse to tears rather than to retaliation. When it is spoken to by grown-ups who are strangers to it, it changes color and stammers out a reply. And when, under observation of which it is conscious, it attempts some performance that calls for nice muscular adjustment, its power of co-ordination is so crippled that the result is a dismal failure.

"In the home, on the other hand, this same child is self-willed and domineering. It brooks neither reprimand nor repression, and the slightest contrariety, from no matter what source, calls forth an emotional outburst which, in all essential details, corresponds to an hysterical convulsion.

"Other striking peculiarities of character are also frequently exhibited. There is no gainsaying the fact that even the most normal child is possessed of a transitory criminality. We are all aware that such a child will lie and steal; that he may be unmoral and without affection; and that he may be cruel to the feeble and to animals. But in the youthful psychopath, owing to its very limited powers of inhibition, these traits are vastly more accentuated, and tend to permanency. In this same child you have the habitual nail-biter and the precocious masturbator, for which peculiarities I have at this time no special explanation to offer."

As to whether psychasthenia, hysteria, paranoia or dementia precox is going to develop, the author offers the following observations: "All four of these clinical forms present certain features in common, but each is marked by peculiarities that are sufficiently distinctive. In psychasthenia the fear-emotion colors all the mental operations to a certain degree, but the counterbalance of judgment is never lost, so that obsessive ideas are not transformed into delusions, and morbid impulses seldom become overmastering. In paranoia the obsessing ideas tend early to become systematized and to focus upon the subject of the sufferer's personal safety and liberty. Fears which the psychasthenic experiences only in certain places and at certain times, and which lead merely to obsessive ideation, are experienced by the paranoiac at all times and in all places. And instead of obsessions, actual delusions of being followed and persecuted, after a time, completely govern the victim's reaction to his environment.

"Dementia precox is to be feared where the powers of inhibition remain markedly weak and the growth of the moral sense does not keep pace with growth in other directions. Here the predatory and animal instincts of the child occupy the foreground of the clinical picture, and we find it to be a shameless liar, a confirmed thief, a natural vagabond, a masturbator and the personification of cruelty.

"In the youthful hysteric the obsessive and impulsive tendencies are by no means so marked and obvious as they are in the psychasthenic, the paranoiac and the precocious dement types. The morbid phenomena exhibited by this child are not constant but periodic, and are usually confined to somnambulism and other automatic acts, and to violent emotional outbursts accompanied by convulsive movements, which may be followed by temporary palsy and contracture of limbs or segments of limbs."

Heredity in Insanity, in the Light of the Mendelian Laws, forms the subject of a study by Gertrude L. Cannon and A. J. Rosanoff,[3] based on pedigrees of 11 patients, including 35 different matings with a total of

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(3) Jour. Nerv. and Ment. Disease, May, 1911.

221 offspring. The facts brought out were found to correspond very closely to the theoretical expectation according to Mendel's laws. These data tend to support the following rules of theoretical expectation as applied to neuropathic tendencies: 1. Both parents being neuropathic, all children will be neuropathic. 2. One parent being normal, but with neuropathic taint from one parent, and the other parent being neuropathic, half the children will be neuropathic, and half will be normal but capable of transmitting the neuropathic makeup to their progeny. 3. One parent being normal and of pure normal ancestry, and the other parent being neuropathic, all children will be normal but capable of transmitting the neuropathic makeup to their progeny. 4. Both parents being normal but each with a neuropathic taint from one parent, one-fourth of the children will be normal and not capable of transmitting the neuropathic makeup to their progeny, one-half will be normal but capable of transmitting the neuropathic makeup and the remaining one-fourth will be neuropathic. 5. Both parents being normal, one of pure normal ancestry and the other with the neuropathic taint from one parent, all the children will be normal, half of them will be capable and half incapable of transmitting the neuropathic makeup to their progeny. 6. Both parents being normal and of pure normal ancestry, all the children will be normal and not capable of transmitting the neuropathic makeup to their progeny.

F. W. Mott [4] takes up the same subject and has studied a large number of pedigrees of cases in the London County Asylums. His conclusions are formulated as follows:

1. Hereditary predisposition is the most important factor in the production of insanity, imbecility, and epilepsy. It is the *tendency* to nervous and mental disease, generally speaking, which is inherited. This may be termed the neuropathic taint.

2. Education, sanitation, and the rest, as Bateson has stated, are only the giving or withholding of opportunity for good or ill.

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(4) Lancet, May 13, 1911.

3. Alcohol is a powerful coefficient, but not of itself the main cause, in the production of insanity, except in the rather infrequent cases of alcoholic dementia.

4. Certain types of insanity may be transmitted with greater frequency than others. This has been termed similar heredity. The types are: Periodic insanity (also termed "manic-depressive"), delusional insanity, and epilepsy. The general rule, however, is for a different type to appear.

5. Mothers transmit insanity and epilepsy with much greater frequency than do fathers, and the transmission is especially to the daughters.

6. Anticipation or antedating is the rule whereby the offspring suffers at a much earlier age than the parent; more than one-half of the insane offspring of insane parents are congenital idiots or imbeciles, or have their first attack in the period of adolescence. This adolescent insanity may take an incurable form of dementia in a large number of cases; in others it is usually mania, melancholia, or periodic insanity, and not infrequently epilepsy with or without imbecility. Very rarely does the parent become insane before the offspring. This is a strong argument of hereditary transmission, possibly hereditary transmission of an acquired character.

7. Regression to the normal average may be (1) by marriage into sound stocks, or (2) by anticipation or antedating leading to congenital or adolescent mental disease terminating the perpetuation of the unsound elements of the stock.

8. High-grade imbeciles who are not at present in any way checked in procreating owing to social conditions interfering with survival of the fittest, together with chronic drunkards, neurasthenics, and neuropaths, are continually reinforcing and providing fresh tainted stocks.

9. Recurrent insanity, owing to the fact that patients are not segregated for any length of time, is probably the most potent cause of insane inheritance. Facts tend to support the opinion that the recurrent types of insanity during lucid intervals may breed a stock of potential lunatics and paupers.

10. Nature is always striving to go back to the normal average and only relatively few of a stock are insane. A stock with a streak of insanity when combined with genius is not bad, and the same may be applied to a nation; but we only want a streak of genius and insanity; the great body of the nation should be of good normal average, for that nation will possess the greatest potential virility in the struggle for existence that can breed from the greatest number of men and women with good bodily health who possess a large measure of the three attributes of civic worth—*viz.*, courage, honesty, and common sense, combined with parentage, pride of family, and pride of race.

The Psychopathology of Suicide. Fifty years ago the great psychiatrist Griesinger expressed the view that the great majority of suicides were the result of mental aberration, and this is generally accepted to-day. Stelzner in Berlin and Gaupp in Munich have examined several hundred persons after unsuccessful attempts, and found nearly all of them to be abnormal (See *Practical Medicine Series,* 1910, Vol. 10, page 217, where Gaupp's figures are given). Now Sichel[5] gives the result of his study of 268 patients who attempted or threatened suicide and arrives at similar conclusions.

Of all mental abnormalities congenital weakmindedness plays the smallest rôle as these patients rarely go beyond empty threats. Hysterical patients often speak and write profusely of their disgust with life and their desire for death and sometimes make the most elaborate preparations which in themselves are a guarantee that someone will interfere at the last moment. Sometimes, however, the expected rescue does not take place and unintentional suicide results. There are a few hysterical patients who may make serious attempts on the spur of the moment after an unexpected emotional shock. Epileptics may commit suicide either in an attack of fury or one of depression. This tendency may persist even when dementia is considerably advanced. Alcoholism plays a great rôle as alcohol lessens the inhibition which acts as a natural restraint. On the other

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(5) Deutsche med. Wochenschr., Mar. 9, 1911.

hand when the delirium tremens patients kill themselves by jumping out of the window there is usually no intention of suicide. The victims of chronic alcoholic deteriorations very rarely attempt suicide and are more prone to give vent to their feelings by threatening their relations.

The so-called psychopathic personalities furnish a large contingent as they lack mental balance, are the sport of their moods and live in a world of desires and intentions without contact with real life. The contrast between their dreams and reality leads to contempt for life. In this class belong the student who commits suicide from disappointed ambition and the soldier, who is prompted by abuse of comrades or superiors; also the suicides of betrothed shortly before the wedding, and of the recently married. Of dementia precox patients, those suffering from the hebephrenic form are least liable to commit suicide. Paranoiacs may do it under the influence of some delusion or an imperative hallucination. The voice may say: "Here is a rope, hang yourself!" Katatonic patients may have sudden impulses without the slightest warning and kill or maim themselves. Thus one of the author's patients suddenly tore out an eye with a piece of optic nerve over an inch long attached to it. [A dementia precox patient formerly under my observation at an insane hospital tore out both eyes and bit off all of his finger tips at one sitting under the influence of a delusion, and in obedience to the biblical dictum: If thine eye offendeth thee, etc.—P. B.] The longer the duration of dementia precox the less the liability to suicide or self-injury.

By far the most frequent suicides are met with in connection with the depressive phase of manic-depressive insanity, and in the melancholia of the menopause where self-accusations and utter hopelessness are so much in evidence. The suicidal tendency here is not merely temporary but frequently constant and present in each attack. In paretic dementia there is some danger in the early stage when hypochondriacal depressive delusions may exist. The attempts often show evidence of the existing deterioration. Thus, one of the author's patient butted his head against a letter-box and another let himself get drenched by a street sprinkler. More serious are the attempts in senile insanity, especially the depressive and persecutory forms.

Tendency to suicide often runs in families. Thus, two-thirds of the female insane patients with a family history of suicide made attempts themselves. Psychic contagion also plays a rôle, as one suicide in an institution is apt to stimulate several others.

Hysterics are apt to choose poison and epileptics some brutal and violent means such as slashing with a knife or shooting. Otherwise no particular forms of insanity showed any special preference in the method selected.

The most important prophylaxis naturally is close observation in an institution. Kraepelin has stated that prompt removal to institutions would prevent 90 per cent. of suicides. The opium treatment of melancholia also has great value as a preventive measure, as well as prolonged baths.

DEMENTIA PRECOX.

Etiology. J. Roubinovitch[6] has analyzed the histories of his cases in the *Bicêtre* in Paris. As to family history he arrives as the following figures:

Tuberculosis	50%
Alcoholism	17%
Arthritic Conditions	13%
Psychopathies	13%
Syphilis	0

As to the previous mental caliber:

Normal intelligence	75%
Mental debility	25%
Peculiarities of character	56%

In 22 per cent of the female patients he found symptoms of mitral stenosis which he interprets as the result of "congenital tuberculous dystrophy." In 55 per cent. of the cases he obtained a positive cutaneous tuberculin test. He believes that this "tuberculous dystrophy" of congenital origin creates a cerebral vulnerability.

As to *treatment,* he is naturallv very pessimistic. In

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(6) Prog. Méd., Mar. 11, 1911

case of excitement he recommends prolonged baths, hypodermic injections of hyoscin and removal of a more or less abundant quantity of cerebrospinal fluid by lumbar puncture.

Pupilary Disturbances in Dementia Precox are discussed by E. Meyer.[7] Bumke has previously called attention to the frequency of failure of dilatation of the pupil and of the normal *unrest* of the pupil by sensory stimulation and psychic excitement. Sluggish reaction to light has been frequently described, and the author found it present in 1 out of every 10 cases of dementia precox. There is, however, a marked inconstancy in this sluggishness. In this paper the author describes another phenomenon, namely, that the pupils when dilated by pressure in the iliac region reacted little or not at all to light, while the pupils reacted normally when no pressure was made. In 2 other cases of undoubted dementia precox the same phenomenon was observed. The author believes that these disturbances must be explained on the same grounds as the similar affection of the light reflex occasionally described on making pressure in the ovarian region of hysteric subjects. In fact the author considers this phenomenon one of the many hysterical features so frequently observed in dementia precox. Bumke has also observed hippus which he ascribes to twitchings of the iris muscle analogous to other muscular spasms in dementia precox.

Psycho-Analysis in Dementia Precox. A. Maeder,[8] an adherent of Freud's, relates the case of a man whose wife was at a tuberculosis sanitarium and unexpectedly received a letter from him in which he declared his intention to get a divorce, giving as a reason the danger of being infected with tuberculosis from the wife. Then he formed the delusion that she had been unfaithful to him and had secretly aborted. As a matter of fact an abortion had been induced on account of her tuberculosis. He finally believed his wife persecuted him and carried weapons to injure him. As he abused and beat her he was committed to an institution. Psycho-analysis revealed the presence of pronounced latent polyga-

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(7) Berlin. klin. Wochenschr., Oct. 3, 1910.
(8) Neurol. Centralbl., 1911, p. 102.

mous and homosexual tendencies in the gratification of which the wife stood in the way; hence the delusions of persecution directed against her.

Similarly the author explains how homosexual tendencies in the process of repression may become converted into delusions of persecution toward the persons to whom the patient formerly directed his desire, analogous to the delusions of jealousy of the alcoholic. He points out how in the psychosis all symptoms relate to certain complexes with strong emotional coloring. Hence the content of the psychosis has a strictly individual character, but the mechanism is the same in different patients. The motions leading to action are relatively few and mostly originate in sexual impressions from childhood. There exists in these patients a marked mental activity of constructive character which finds its expression in the building up of delusions. Thorough investigation by the psycho-analytic method shows that the incoherence and seemingly desultory stream of thought in the late stages of dementia precox are only apparent, and that deterioration or dementia in the manner in which it occurs in the organic psychoses is not present. On the contrary, the patients think intensively. They may be able to describe relatively complicated pictures and repeat short stories. An important source of error is the poor mental concentration. It is essential for the investigator to get thoroughly into the confidence of the patient in order to dislodge the complexes.

PARETIC DEMENTIA.

Treatment with Sodium Nucleinate. This treatment, particularly advocated by Donath, depends on the production of artificial fever and leucocytosis, and was based on the occasionally reported remissions in the disease following acute febrile affections. Otto Klieneberger[9] criticizes Donath's conclusions and doubts the correctness of the diagnosis in some of the cases. He has himself employed the method in 15 undoubted cases, and has not seen either physical or mental improvement

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(9) Berlin. klin. Wochenschr., Feb. 20, 1911.

in any case, while in 3 cases there was a temporary aggravation. [It may be recalled that tuberculin has been used for the same purpose, particularly by Wagner v. Jauregg.—Ed.] Joseph Loewenstein[1] gave the method a trial in 13 cases and agrees with Klieneberger that it is of no value.

[The laboratory diagnosis, mercurial and salvarsan treatment of this disease are discussed elsewhere in this volume. See syphilis of the nervous system, tabes, and salvarsan.—Ed.]

Korsakoff's Psychosis.

Korsakoff's Psychosis in a Case of Cysticercus of the Brain in an alcoholic subject is reported by Josef Freud.[2] A heavy drinker, 43 years old, who has had partial paralysis of some of the external ocular muscles for several years, had a few transient attacks of unconsciousness and was admitted to the hospital when examination revealed absolute rigidity of the right pupil, loss of the light reflex in the left pupil, paresis of the right superior rectus muscle and of the right facial muscles. Ataxia of the cerebellar type and tremor of the fingers were present. Mental symptoms in the form of defective orientation, loss of memory for recent events, retrograde amnesia and tendency to confabulation began to develop some months later. Optic neuritis with hemorrhages also developed. The muscles and nerve trunks of the extremities were slightly tender, the knee reflexes were diminished, there was a positive Babinski sign and ankle-clonus on the left side. The Wassermann test was negative. He gradually failed, developed severe diarrhea and died. At the necropsy cysticerci were found over the right half of the pons and in the floor of the fourth ventricle. The pia mater was thickened and there was marked internal hydrocephalus.

The case is of interest on account of the problem raised, whether the mental disturbance is to be attributed to the gross brain disease or to the alcoholism.

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(1) Berlin. klin. Wochenschr., Apr. 17, 1911.
(2) Wien. med. Wochenschr., Jan. 7, 1911.

The author does not offer any opinion on this point. [The existence of an Argyll-Robertson pupil on the left side in a case of cysticercus disease of the brain is also noteworthy in view of Babinski's dictum that such a pupil always means preceding syphilis. Other authentic cases of Argyll-Robertson pupil in alcoholics and brain tumors without syphilis have been reported, but the general rule remains that in the presence of such a pupil one should be extremely reluctant in rejecting a syphilitic etiology.—ED.]

THE GENERATIVE PSYCHOSES.

Insanity in Connection with Pregnancy, Puerperium and Lactation. W. Runge,[3] from the psychiatrical clinic of Kiel, has made an extensive study of this subject. Like all other modern writers he does not speak of specific puerperal or lactational insanity but classifies the cases occurring at these periods among the various recognized psychoses, most frequent of which are the katatonic form of dementia precox, manic-depressive insanity and "amentia" (confusional form of a toxic or exhaustion psychosis). The cases occurring during pregnancy ran a more favorable course than the puerperal and lactational ones, largely on account of the great frequency of hysterical psychoses in the former. In the cases of insanity during pregnancy immediate improvement after labor was observed only in cases where the mental disturbances arose as complications of hysteria or chorea.

The author can not confirm Fürstner's statement that psychoses appearing toward the end of pregnancy are particularly unfavorable. He finds that the pregnancy and puerperal psychoses are relatively more favorable in younger women while lactational insanity gives a better prognosis in the older ones. The prognosis in primiparæ is also relatively better than in multiparæ. The rôle of nursing in determining the course of puerperal psychoses can not be definitely stated for lack of accurate observation. Of 48 patients who nursed

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(3) Archiv. f. Psychiatrie, Vol. 48, p. 545.

for at least a few days, 71 per cent. ran a favorable course, while in 22 patients who did not nurse their babies at all 60 per cent. recovered. The author, however, is not willing to conclude that nursing exerts a favorable influence, especially as most of these patients had nursed only a few days.

The duration in these psychoses may be from days or weeks to years. Weebers places the average duration at nine months. Of the author's 39 cases with recovery only one case lasted over one year. Seventeen of these patients gave birth to children later, and 15 of them again nursed their babies. Only 2 had mental disturbance with subsequent childbirths and these recovered again.

As to prophylaxis the author recalls that of his 110 cases of generative psychoses, 16 or 14.5 per cent. previously had passed through attacks of mental disease. While it would go too far to prohibit marriage to every woman who had suffered from mental disease, it is necessary to warn every person who has once had one of the three phases of generative psychoses against having any further pregnancy. This is of particular importance in cases of katatonia, mania and melancholia, while recurrence is scarcely to be feared in cases of amentia or of hysterical psychosis. Should another pregnancy occur the patient must be carefully guarded against nervous disturbances during the pregnancy, and measures must be taken to minimize the danger of hemorrhage, infection, or exhaustion from prolonged labor. It is safest to take such a patient to a hospital or maternity before delivery. The value of prophylaxis is shown by the decrease in generative psychoses since the advent of antisepsis and asepsis. The author also advises great caution in permitting the mother to nurse in order to avoid an additional source of weakness, although his observations, as stated above, do not indicate any harmful effect.

The first point in treatment is to guard against suicide. Twenty-seven per cent. of the author's patients made serious attempts, and 15 per cent. more talked about it. This danger is particularly great in melancholia, hysterical psychosis and amentia. With an hysterical puerperal patient we must not make the mistake of not taking their suicidal tendencies seriously. Homicidal tendencies also occur and are practically always directed against the patient's children. On account of these dangers, every case of puerperal psychosis should be treated at an institution. The child should be separated from the mother at the first appearance of mental disturbance.

There is much difference of opinion about the advisability of inducing labor in cases of psychoses during pregnancy. This is only unanimously admitted to be necessary in cases of eclampsia. Many authorities also advise it in the chorea of pregnancy, when it is combined with mental disturbance, disturbances of the heart or marked exhaustion. The author believes that in nearly all cases of chorea gravidarum it is unnecessary to induce labor. He quotes Chrobak[4] as stating that in 50,000 obstetric cases it was not necessary to induce labor on account of chorea gravidarum in a single instance. In cases of epilepsy it is only exceptionally necessary to induce labor in order to save the mother's life according to Runge. Others resort more frequently to this measure. Some consider the existence of an epileptic psychosis sufficient; others, only status epilepticus. In states of mental depression the psychiatrists seem more prone to advise abortion than the obstetricians. Chrobak in his 50,000 cases never resorted to it even when so advised by psychiatrists, and often found great improvement in very severe cases immediately after childbirth. In other cases the depression disappeared after the mother began to feel the movements of the child.

E. Meyer[5] devotes a long paper to the puerperal psychoses and also remarks on their decreased frequency in recent years with the advent of improved hygienic measures. In addition to actual psychoses, he calls attention to the transient mental disturbances during or immediately after childbirth. They have been par-

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(4) Zentralbl. f. Gynäk., 1907, p. 248.
(5) Archiv. f. Psychiatrie, Vol. 48, p. 459.

ticularly dwelt upon by Anton.[6] They depend partly on pre-existing neuroses such as epilepsy and hysteria, or defective mentality, or they are produced as a result of physical and mental conditions during delivery; but even here a certain degree of predisposition must be assumed.

Anton mentions as exciting causes variations in blood-pressure and the many sources of mental excitement, especially in unmarried mothers. The frequent abnormal emotional state during labor, characterized by fear, irritability, general excitement with resistiveness is of importance, and may constitute a form of delirium with clouding of consciousness and impaired memory. Orientation and perception are greatly disturbed. There may be great excitement with screaming and tendency to violence, even to attempts at killing the child or committing suicide. Unusually severe pains predispose to this disturbance which has been designated "pain delirium." The duration is only a few hours, and the condition subsides during the period of marked exhaustion after the completion of labor. Anton recommends the use of chloral, morphin or hyoscin for a brief psychosis.

As to the puerperal psychoses proper, Meyer also denies the existence of a specific puerperal insanity. He, too, finds that dementia precox, especially the katatonic form, is frequent and that its diagnosis from amentia is of great importance on account of the good prognosis of the latter. In dementia precox consciousness is less clouded and the patient is indifferent or silly, while the amentia patient is confused, often perplexed and full of fear. When the excitement subsides the contrast between the dreamy, apprehensive confusion of the amentia patient and the dull indifference of the one with dementia precox is marked. The diagnosis is most difficult during the initial excitement.

In regard to treatment particular stress must be laid on the physical conditions especially in the amentia group where the mental disturbance is usually in direct

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(6) Handb. f. Gynäk., 1910.

proportion to the physical depletion. The most important prophylactic measure is the avoidance of puerperal infections. Furthermore, the marriage of very psychopathic, epileptic or hysterical women should be discouraged and the idea should be vigorously combatted that marriage may be beneficial to such individuals. A woman who has had a puerperal psychosis should avoid further pregnancies even though we often find that no disturbance occurs with subsequent ones.

Ph. Jolly[7] contributes an analysis of 79 cases of generative psychoses which were found to belong to following clinical forms:

	Pregnancy.	Puerperium.	Lactation.	
Epilepsv	—	3	—	3 = 4%
Eclampsia	2	1	—	3 = 4%
Chorea	1	—	—	1 = 1%
Mania	—	5	2	7 = 9%
Melancholia	3	11	1	15 = 19%
Circular Insanity	—	1	2	3 = 4%
Paranoia (Chronic with acute onset)	—	3	—	3 = 4%
Katatonia	1	3	2	6 = 8%
Amentia	1	19	8	28 = 35%
Delirium, acute and fever	—	3	—	3 = 4%
Hallucinatory Excitement on the basis of imbecility	—	5	—	5 = 6%
Not Classified	1	1	—	2 = 2%
	9	55	15	

It will be noted that Jolly has decidedly fewer cases of katatonia than Runge and Meyer. Heredity was found to be a factor in two-thirds of the melancholia cases, one-half of the amentia cases and one-third of the katatonia cases. Infection and other debilitating causes existed extensively in the amentia cases, to a less extent in the melancholia and mania cases and not at all in the katatonia cases. Melancholia predominated among the cases which came on during the first few weeks following childbirth. A very sudden onset was most frequent in amentia and also occurred in mania and katatonia, while melancholia generally came on gradually. Of the patients 46 per cent. recovered completely, and in 13 per cent. there was almost complete recovery; 13 per cent. died during the first year.

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(7) Archiv. f. Psychiatrie, Vol. 48, p. 792.

The following factors make for an unfavorable prognosis: Congenital mental defect; slow onset; previous mental disease in youth or without special cause. The prognosis is favorable in cases where infection and exhaustion are causative factors. The duration was usually long in cases with psychopathic heredity; in patients over 30 years of age; when the onset was slow; and in cases of amentia with prominent katatonic traits. The duration was short in cases which came on within two weeks of childbirth and in cases dependent on infection. Of 30 surviving children, 3 were mentally defective at the time of writing.

Näcke[8] also contributes an article with a report of 12 cases. He brings out these points: 1. Pregnancy, childbirth, and the puerperal state, like menstruation, do not exert any definite influence on the course of chronic psychoses. 2. The psychosis, as such, does not influence the generative phase unfavorably. 3. Labor, as a rule, was rapid, with little hemorrhage and pain, and generally did not require artificial aid. 4. The puerperium generally took its normal course. 5. The mother generally did not care for the child. The author warns against assuming off-hand a connection between these generative events and the onset or aggravation of a psychosis, as the relation often is one of mere coincidence. Still more certain is the non-existence of a specific psychosis of pregnancy.

To induce abortion is only justified in exceptional cases when there are sufficient somatic indications or when the states of fear or excitement are of extreme severity. As a prophylactic measure abortion is entirely to be discountenanced. In certain degenerative psychoses where the likelihood of transmission to the offspring is great, sterilization might be considered for sociologic reasons, but not in order to protect the individual against future pregnancies. The author permits the mother to nurse the baby providing she can be watched and providing the quality of the milk is good.

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(8) Allg. Zeitschr. f. Psych. u. Neurol., 1911.

THE ARTERIOSCLEROTIC PSYCHOSES.

Pilcz[9] of Vienna takes up this subject in a systematic manner.

Etiology. Fürstner, who found evidence of heredity in only 20 per cent. of arteriosclerotic and senile psychoses, makes the statement that in certain families there is a tendency to weakness of the circulatory system with many cases of arteriosclerosis. With this Pilcz agrees and adds that in such families cases of senile or arteriosclerotic dementia as well as apoplexy are frequent, while ordinary neuropathic heredity plays no rôle. Conversely, such vascular heredity has little importance in connection with other nervous and mental disorders, with the exception that involution melancholia often occurs in families in which apoplexy is a common event. Alcohol and tobacco as well as lead poisoning are factors of importance to which the preponderance of arteriosclerotic affectious in the male sex is largely due. The rôle of syphilis is denied by some authorities, such as Grasset, and admitted by many others. Prolonged physical and mental fatigue is important, and among occupations which seem to predispose are those of the saloonkeeper, actor, army officer and merchant. The occurrence of cranial injury as well as traumatic neurosis or a severe psychic shock may aggravate existing arteriosclerosis which previously had caused no symptoms. A similar rôle may be played by acute infectious diseases such as influenza and pneumonia.

Symptomatology. The classification proposed by Alzheimer is used by the author.

1. The light, nervous form of cerebral arteriosclerosis. The symptoms are practically those of neurasthenia, and for this reason we should be cautious in making the latter diagnosis in elderly subjects previously not neuropathic. There is a tendency to hypochondriasis, to exhaustibility on mental effort, and to incapacity for originating new ideas. [See review of Cramer's work on the same subject in the *Practical*

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(9) **Wien. med. Wochenschr., 1911, Nos. 5, 6, 7 and 8.**

Medicine Series, 1910, Vol. 10, p. 196.] There is nearly always a marked feeling of illness and clear insight which helps to differentiate it from the physiologic presenile involution, as does the occurrence of marked variation in the intensity of the symptoms, notably, most surprising periods of improvement. The most frequent bodily complaints are headache and vertigo, and on careful examination there are usually some unilateral motor or sensory findings. Severe apoplectiform attacks are not frequent in this form while evidence of arteriosclerosis in other organs, especially the heart and kidneys, is frequent. There is sometimes a gradual transition between transient attacks of vertigo or fainting of cardiac origin and senile epilepsy. The prognosis in this form is not unfavorable as there is not only a tendency to remissions, but it does not often lead to severe mental change. The mild neurasthenic symptoms may be the only ones for a dozen years or more, and then the patient, without having developed actual dementia, may succumb to a sudden vascular or uremic attack.

2. Severe, progressive, arteriosclerotic degeneration of the brain. The essential feature is a dementia which generally progresses by leaps. The most characteristic symptom is slowness and difficulty of thinking, or inhibition of the associative activity, which often leads one, on superficial examination, to consider the dementia more severe than it actually is. The memory for recent events and appropriation of new ideas suffer in particular, while the judgment and critical faculties decay more slowly. Thus arteriosclerotics with very poor memory may play chess remarkably well. In contradistinction to true senile dementia the patients are generally not suggestible and do not show a tendency to fill in their defects of memory by means of confabulation. In this form there are also occasional periods of surprising improvement. The duration is generally from one to six years, and most patients succumb to intercurrent affections, especially hypostatic pneumonia, while some progress to a stage of profound dementia which may reach a degree as extreme as that

of general paresis or senile dementia. On account of the keen insight and lack of tendency to euphoria, the emotional state is generally one of depression which may be coupled with genuine hychondriacal delusions. The fluctuations in the depression, the greater amenability of the patient to reason and the physical signs of arteriosclerosis distinguish such cases from involution melancholia. In the later stages the patients become dull and apathetic rather than depressed and often show a mask-like stiffness of the features. Signs of ethical deterioration with display of egotism or brutality are frequent, but it is claimed that this represents merely an aggravation of tendencies which normally existed in the patient. Imperative ideas also may be present. Physical complaints like those mentioned in connection with the previous form described are prone to be prominent, so that on the whole the arteriosclerotic patient impresses one as a case of brain disease, not as a case of mental disease like the general paretic and senile dement. There may be intercurrent attacks of delirious or confusional states often following epileptiform or apoplectic attacks.

Alzheimer's group 3, senile cortical atrophy and 4, perivascular gliosis, will be omitted as being of only anatomic interest.

5. Encephalitis subcorticalis chronica progressiva (Binswanger). In addition to the deterioration of memory and associative mental processes the most striking features of this form are focal symptoms due to interruption of connection between definite cortical areas. Such symptoms, several of which usually exist, are hemianopsia, aphasia, astereognosis, cortical deafness, impulsive laughter, etc. A certain amount of insight, here also, remains surprisingly long.

Somatic Symptoms. All authorities agree that there is no parallelism between the severity of the sclerosis of the peripheral vessels and those of the brain. The condition of the retinal and choroidal vessels gives a much better indication of the probable state of the vessels in the brain. [See p. 79 in this volume.] Narrowing of the visual fields is not unusual in cerebral arteriosclerosis. Disturbance of pupillary reaction, such as slow or paradoxical reaction, absolute rigidity or Argyll-Robertson pupils, may exist, particularly in form 5 described above. In contradistinction to syphilitic brain disease, paralysis of ocular muscles is rare. Cardiac hypertrophy and contracted kidneys are almost always present. The blood-pressure is generally increased, a symptom of some value in differentiation from general paresis in the early stages of which the pressure is usually within normal limits, and in the late stages, below normal. The functional activity of the kidneys is nearly always lowered. Headache is nearly always present in the early stage of cerebral arteriosclerosis, but when the dementia has advanced the patients rarely complain of headache. More or less insomnia is nearly always present in the early stage, while later there is often a tendency to somnolence. Disturbance of articulation is frequent and may resemble that of general paresis.

Combination with Other Psychoses. The combination with true senile dementia or with general paresis naturally leads to clinical pictures where the elements due to arteriosclerosis *per se* are exceedingly difficult to single out. It is important to know that undoubted, true manic-depressive insanity may arise on the basis of arteriosclerosis and even immediately follow an apoplectic attack in the case of individuals with neuropathic heredity.

Differential Diagnosis. Type 1, as was stated, strongly resembles ordinary neurasthenia. The triad, headache, vertigo and impaired memory, should direct attention to arteriosclerosis; and, as a general proposition, when a person about the age of 50 develops headache from which he previously rarely suffered, organic brain disease should always be suspected. In the differentiation from general paresis examination of the cerebrospinal fluid, including the Wassermann test, is of particular importance. The same is true of cerebral syphilis where ocular paralyses also are more frequent and where hallucinations of hearing play a greater rôle than in arteriosclerosis or in general paresis.

Medico-legal Aspect. In connection with the question of capacity for making a will it is pointed out that on account of the coexisting focal symptoms, particularly aphasia, the degree of mental deterioration is apt to be over-estimated.

Treatment. As to prophylaxis, many causes of arteriosclerosis are naturally beyond control, but the author emphasizes the importance of abstinence from alcohol, avoidance of undue fatigue in athletic sports and abstaining from an excessive meat diet. When the first symptoms have appeared, absolute abstinence from alcohol is a prerequisite for all further treatment. In addition to guarding against fatigue and excitement of all kinds, the systematic prolonged administration of iodids is of distinct benefit. The author has found that potassium iodid is superior to the various recent substitutes invented. When the stomach is intolerant to the drug, its administration by rectum is very satisfactory. Hydrotheraphy, especially the carbonic acid bath, is useful. Constipation must be carefully combatted. As to hypnotics which are frequently necessary, the author has found that the otherwise reliable veronal is unsuitable as productive of headache and other untoward symptoms. He considers paraldehyd the ideal hypnotic for an arteriosclerotic person, and sulphonal also may serve well. For the headache, antipyrin and caffein are considered least harmful. In some cases he got striking results from inhalations of oxygen and the application of leeches to the mastoid region.

TRAUMATIC PSYCHOSIS.

Mental Disturbances Following Trauma. E. Meyer[1] has systematically studied the mental symptoms of 37 patients from the time of injury. Calculation, association, memory, orientation and other tests were methodically carried out. Mental changes were observed in 25 of the cases. Two died within two days, 5 developed severe and prolonged psychoses, while in 18 cases milder disturbances existed. Sixteen of the latter showed de-

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(1) Berlin. klin. Wochenschr., May 8, 1911.

fective orientation, particularly as to time. Both the day of the week and the date were generally misstated by one or two days. Orientation for place was much less frequently disturbed. The disorientation for time generally lasted only one or two days. Immediate memory *(Merkfähigkeit)* was impaired in most cases, and the disturbance lasted longer than that of orientation. It was tested by the repetition of figures or of short stories or the description of pictures. Calculation tests, particularly subtraction, were found especially useful in testing attention, general psychic activity and particularly exhaustibility. The latter was one of the most marked features of the cases. Another frequent feature was "perseveration" or the tendency to give the same answer to several succeeding questions.

As to the emotional condition of the patients, it was very frequent to find lack of feeling of illness, and an unnatural sense of well-being, even when the patients in the same breath would complain of severe headache. This tendency to euphoria in cases of commotio cerebri has been dwelt on by other observers such as Schwarz.[2] Association tests made soon after the injury showed a marked tendency to refer to the injury. The tendency to perseveration, evidently dependent on fatigue, was marked in the association tests. In the more severe and prolonged cases the picture was frequently that of Korsakoff's syndrome with tendency to confabulation as a marked feature. Most of the patients had sustained injuries to the head.

Psychic disturbances seemed most frequent in the absence of any important external injury. Fall on the occiput was strikingly common. The mental disturbance appeared to be due to the general brain injury, irrespective of the presence or absence of local lesions, and appeared to be analogous to that produced by other exogenous causes such as strangulation or infectious diseases. Hence there is nothing specific about the mental disturbances produced by trauma. Just what moments determine the occurrence of a severe psychosis is un-

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(2) St. Petersburger med. Wochenschr., 1910, No. 19.

certain. At any rate it is not as a rule explained by the severity of the injury.

The Mental Disturbances Following Stroke by Lightning, according to H. König,[3] are of two kinds: (1) neuroses and slight psychoses identical with those following other forms of trauma; and, (2) more severe organic affections, often similar to paretic dementia. Thus, Becker[4] has reported the case of a woman, 56 years old, who, after being struck by lightning developed a hemiplegia which gradually subsided and was followed by a mental disturbance with the characteristics of senile dementia.

König reports in detail a case of rather severe hysterical psychosis which came on five years after the lightning stroke and was preceded during the entire interval by symptoms of a rather mild traumatic neurosis. During the psychosis hallucinations of hearing associated with subjective color perceptions occurred which were thought to originate in imperative ideas. Such imperative hallucinations on hysterical basis have been described by other authors.

The whole subject of nervous and mental disturbances following lightning stroke is thoroughly discussed in a lengthy article by Hans Willige[5] in which 2 cases are reported, the literature reviewed and a bibliography of 99 numbers appended. There has been considerable difference of opinion as to the relative importance of the organic change caused by the electricity and the functional or hysterical element. At the present time most writers take the middle ground, and agree with Oppenheim who, in his text-book states that in the nervous disease following lightning stroke signs of organic nerve lesion are frequently combined with those of functional neurosis.

The author divides his cases into two groups.

Group 1. Cases of genuine direct injury from lightning. In this group the lightning has struck the human body without passing through any intermediate metallic

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(3) Berlin. klin. Wochenschr., June 19, 1911.
(4) Münch. med. Wochenschr., 1909.
(5) Archiv. f. Psychiatrie, Vol. 48, p. 1132.

conductor. Eight cases are reported. The symptomatology is divided into three stages.

1. The stage of initial unconsciousness.
2. The stage of transient irritative and paralytic phenomena.
3. The stage of definite lasting symptoms of loss of function.

The author states that this subdivision does not fit all cases. Among the symptoms of lasting loss of function, paralysis of one or more cranial nerves is especially frequent, and injuries to the cranial nerves also play an important rôle in the second stage. In the individual case healing may occur after each of the stages mentioned. However, it is rare to have recovery immediately after the initial unconsciousness, while it is most common at the end of the second stage. The prognosis on the whole must be considered favorable as the incurable permanent symptoms usually are slight. The chronic psychoses and organic nervous disease observed after lightning stroke are in the first place extremely rare and secondly, their etiologic relationship to the lightning is still unexplained.

The typical clinical picture following direct injury to the nervous system by lightning may be schematically outlined as follows: The injury is immediately followed by unconsciousness lasting from a few minutes to several hours, at the end of which signs of paralysis in one or more limbs or paralysis of cranial nerves are detected (anosmia, amaurosis, dilated and rigid pupils, deafness, aphasia, etc.), or more rarely there are states of excitement and confusion. All of these phenomena last days or weeks, occasionally months, whereupon in most cases recovery sets in. In some cases more or less permanent loss of function remains, usually in the form of paralytic symptoms which may improve in the course of time. The mental excitement and confusion ("fright delirium") always disappear in a short time. In some cases a more or less complete traumatic neurosis develops during or after the occurrence of the original symptoms.

Group 2. Cases of genuine indirect injury by lightning. Here the lightning passes through a metallic conductor before reaching the human body, hence most cases occur in telephone and telegraph operators. The rôle of fright and psychic trauma is much more in evidence than in the first group and the actual electric shock is usually much less. Signs of organic nervous lesions are relatively uncommon while the symptoms met with are the familiar ones of neurasthenia and hysteria. With the exception of affections of the ear, such as rupture of the drum, all the symptoms relate to the nervous system. The author reports 4 cases, all in female telephone or telegraph operators. Most of the patients of the group are of a neurotic disposition, and the lightning stroke merely serves to bring out symptoms of latent hysteria. Functional cardiac disturbances are nearly always present and are probably chiefly psychic in origin, although occasionally there may be organic injury of the pneumogastric or of the sympathetic nerves.

Inasmuch as the indirect form of lightning stroke most commonly affects telephone operators working under similar external conditions, the cases are quite similar and usually of the following type: The operator, who has the receiver on the left ear at the moment when lightning strikes the telephone wire, experiences a subjective sound or a sensation in the left side of the head followed by evidences of fear. Then there is a transient stunning which may amount to a brief faint, followed by symptoms of emotional excitement, such as crying or fear and various pains, especially headache and abnormal sensations as ringing in the ears, dizziness and feeling of deafness. The last-named symptoms generally remain in varying intensity and gradually become part of a symptom-complex of chiefly hysterical character, largely affecting the left side of the body with a constant nervous disturbance of the heart's action. In some cases there are also signs of organic affection of some of the cranial nerves or of the sympathetic nervous system. The prognosis is not very favorable. Improvement may take place, but complete recovery with return of capacity for continued work in the same occupation is very rare.

ALCOHOLIC PSYCHOSES.

Race and Alcoholic Insanity. George H. Kirby[6] remarks that the population of New York City furnishes a rare opportunity for comparative studies in race psychopathology, and that the conditions of a scientific experiment are almost fulfilled, as a number of races of pure blood live side by side in large colonies in a uniform general environment. In his work at the Manhattan State Hospital which receives patients almost exclusively from the City of New York, he has been impressed with what appears to be a relation between racial types and certain forms of mental disease. It was particularly noticed that in some races alcoholic insanity is remarkably frequent, while in others it is extremely rare. An analysis of 1,762 cases of both sexes shows the following percentage of alcoholic insanity: Irish, 20; German, 9; Italian, 5; Negro, 4; Jewish, 0.6; American (children of native born parents), 5; other races, 10. For the men alone the figures were: Irish, 30; German, 12; Negro, 9; Italian, 8; Jewish, 1.2; American, 5; other races, 15. And for the women: Irish. 15; German, 3; Negro, 0; Italian, 0; Jewish, 0; American, 5; other races, 3.

The remarkably high figures for the Irish race are startling and it is regrettable that differences in nomenclature and confusion as to what psychoses are to be designated as alcoholic make it impossible to obtain comparable figures regarding the Irish in their native land. Since many factors, such as occupation, social customs, etc., are involved which require further investigation it cannot yet be stated whether this race is naturally more susceptible to alcohol. The fact is of importance that the Irish mostly drink whiskey, while the Germans drink more beer and the Italians more light wines.

TOBACCO PSYCHOSIS.

A Tobacco Psychosis in a boy 13 years old is described by Pel[7] of Amsterdam. This boy worked in a

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(6) Jour. Amer. Med. Assoc., July 1, 1911.
(7) Berlin. klin. Wochenschr., Feb. 6, 1911.

cigar factory and smoked from ten to twenty cigars a day. When brought to the hospital he complained of loss of appetite and vague pains in the extremities. The parents said that his character had changed, and from an affectionate, industrious and obedient boy he had become transformed into an irritable, disobedient, absent-minded person. There were rapid changes between excitement, depression and exaltation, and hallucinations were present at times. There was no psychopathic heredity. The heart's action was slightly irregular. The author is certain that tobacco was the causative factor and makes a favorable prognosis.

NSANITY AND BRAIN TUMOR.

The Mental Symptoms in Brain Tumor form the subject of a very lengthy study by Berthold Pfeifer.[8] Eighty-six cases from Anton's Clinic at Halle were studied in which the tumors were located as follows: Frontal lobes, 13; motor area, 10; temporal lobes, 15; parietal lobes, 8; occipital lobes, 2; deep white matter, 7; corpus callosum, 3; hypophysis, 2; basal ganglia, 3; pons, 3; cerebellum, 9; multiple sites, 11. Of the tumors examined histologically, 11 were found to be glioma, 8 sarcoma, 4 metastatic carcinoma, 2 endothelioma, 2 tubercle, 1 chondroma, 1 myxoma, 1 neurofibroma.

The principal conclusions are as follows: Brain tumors give rise to local and general symptoms by affecting the association systems as well as the projection systems of fibers. The less marked the general symptoms, the greater the importance given to the focal ones.

In a small number of cases, psychic irritative symptoms, particularly hallucinations affecting one of the special senses, are to be regarded as focal symptoms. However, circumscribed loss of mental functions is of much greater localizing value. Thus agnostic and amnesic-aphasic disturbances point to the posterior part of the left cerebral hemisphere.

General diminution of attention does not point to

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(8) Arch. f. Psychiatrie, Bd. 47, pp. 558-738.

any particular locality, but as attention is to a great extent dependent on the condition of the receptive centers of the various special senses, impaired attention in connection with a certain special sense may have a certain localizing value, especially when there is little or no general clouding of consciousness.

General mental disturbances are not of localizing value. The author found no evidence that the frontal lobe is a center for higher mental functions, as in his cases of frontal lobe tumor, intellectual defect, especially impairment of judgment, morality and attention and changes in character were not much more frequent than in tumors of other brain regions. The so-called *Witzelsucht* cannot be recognized as a local symptom of frontal lobe disease.

In cases of tumors of the motor area epileptiform attacks are common and also other symptoms characteristic of epilepsy, such as psychic equivalents and certain abnormal moods.

In tumors of the left temporal lobe there were always signs of sensory aphasia and in most cases other amnesic, aphasic, agnostic, apraxic and word-persevering symptoms. Amnesic aphasia also occurs in tumors of the left parietal lobe, although sensory and "psychic" paralysis is more frequent.

In tumors of the occipital lobe, aside from cortical blindness, mind-blindness, alexia and optic aphasia, there may exist as a striking psychic, local symptom, a diminution of attention for visual impressions coming from the side opposite that of the tumor.

In tumors of the corpus callosum the mental disturbances resemble those occurring in tumors of the hemispheres, but other symptoms of cortical irritation or loss of function are entirely missing.

Cerebellar tumors give as the only psychic local symptom, loss of orientation as to the position of the body in space, which is due to interruption of the frontocerebellar connections. The occurrence of various mental symptoms in cases of cerebellar tumor can be explained only through the general effect of the presence of a tumor on the cerebral cortex.

As to the mental disturbances produced by the general effect of brain tumor, by far the most important one is stupor in varying degree. Decreased attention, retardation and blunted emotions are generally proportionate to the degree of stupor. Emotional disturbances independent of the existence of stupor are present in almost all localizations of brain tumor, but were found most frequently in tumors of the Rolandic area. In these cases the emotional instability and general irritability bore considerable resemblance to the "epileptic character." Confabulation was strikingly frequent. Disturbances of orientation independent of the existing stupor consisted chiefly in impaired memory especially for recent events, and lack of proper grasp on the surroundings. In other words, there was lack of elaboration of impressions recently acquired.

Among all mental clinical pictures encountered in brain tumor, the Korsakoff symptom-complex is by far the most frequent one and was at least partially present in one-half of the author's cases. In three-fourths of the cases in which this syndrome occurred no etiologic factor aside from the brain tumor could be elicited. Multiple neuritis was present in only 4 cases.

Delirious states were frequently associated with Korsakoff's syndrome and constituted the second most frequent mental picture encountered. Other distinct mental pictures were rare, and were met with in only 5 of the author's cases, one being an epileptic psychic equivalent or a "twilight state," anxiety psychosis once and katatonia in three cases. The author does not accept Schuster's statement that the typical mental picture of general paresis may occur in brain tumor, nor Gianelli's view that the early appearance of mental disturbance speaks for a location in the frontal lobe. In 5 cases the mental disturbances together with the general symptoms of increased pressure disappeared after extirpation of the tumor. The idea therefore appears plausible that the mental symptoms are to be looked upon as general symptoms. That Korsakoff's psychosis and delirious states are the result of the general effect of the tumor is supported by the fact that they occur in tumors of very varied localization.

IDIOCY.

Mongolian Idiocy. William N. Bullard,[9] in a very profusely illustrated article, states that this term was first suggested by Langdon Down, in 1866, on account of the supposed resemblance of these patients in facial type to the Mongols or Kalmucks. It was found that this class of idiots also had other characteristics which has led to considering "Mongolian idiocy" a clinical entity. Bullard enumerates these features as follows:

1. In the first place, Mongolian idiots almost universally show signs of general arrested development. They are small and symmetrically developed but appear, especially during the period of growth, like children two or more years younger than they actually are. Thus a Mongolian idiot of fifteen is apt to present the appearance of a child of twelve or thirteen.

2. Another symptom characteristic of Mongolian idiocy is brachycephaly. The cranium in these patients is not only small and often so disproportionately small as to be technically microcephalic, but it is brachycephalic; that is, the transverse diameter is excessively large in proportion to the shortened antero-posterior diameter. It immediately suggests itself that this condition may have some relation to the shape or size of certain bones at the base of the cranium and may influence or cause some of the other peculiarities, mental or physical, belonging to this type, but no evidence of this has yet been shown.

3. The occiput is apt to be steep or flat.

4. The face of the Mongolian idiot is usually wanting in intelligence, and is dull or stupid in expression.

5. One of the most obvious and characteristic signs of this condition is the slanting direction of the eyes, that is, of the eyelids and the space between them. This is almost a pathognomonic sign, yet it is said to occur exceptionally in other forms of idiocy and even oc-

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(9) Boston Med. and Surg. Jour., Jan. 12, 1911.

casionally in the otherwise normal Caucasian. This condition is frequently accompanied by an epicanthal fold, and in one of Bullard's cases the line of the upper eyelid was so extended as to form a distinct fold above the external canthus.

Strabismus is not rare, but is not distinctive. Nystagmus is said to be often present in the first six months of extra-uterine life. The face is often broadened and flattened; the nose broad, its bridge sunken and the nostrils facing upwards, thus resembling the face of the cretin or cretinoid idiot. In many cases, however, this facial form is not present.

The skin of the face is delicate, thin, easily roughened. The mucous membranes are extremely sensitive and liable to irritations and inflammations, particularly blepharitis and nasal catarrh. It is said that when certain of these patients cry their eyelids swell like bladders and may become everted.

Almost pathognomonic also is the appearance of the tongue, which shows deep, sharp-edged, more or less transverse fissures in its anterior and middle portions. These do not appear at birth; the earliest date of appearance noted seems to have been at twenty-two months. Hypertrophy of the fungiform papillæ is reported. Muir states that palatal deformities occur in 65 per cent. The teeth are apt to be irregular in size, shape and position. The thyroid gland is normal.

Internal Organs.—Congenital heart disease is frequent. Non-closure of the interventricular septum and persistence of the ductus arteriosus are found. No other special anomaly of the internal organs has been noted.

Laxity of the joints is most striking. It is apt to be specially marked in the hips. These patients have the habit of sitting tailor-fashion. One of those examined by Bullard used to shut himself up like a jackknife, each foot on the opposite shoulder, and thus sleep at night.

In appearance, the long portions of the limbs do not differ from those of the normal person of the same age except in being often symmetrically smaller. The hands are short, flat and stumpy. There is said to be at times a disproportionate shortness of the thumb and of the fifth finger. Much has been written about the peculiar inward curve of the fifth finger, but this is not always present and, moreover, has been found to occur in other varieties of defectives and in normal persons, and is not characteristic.

The feet are usually normal in appearance except as regards size. They may appear short and stumpy like the hands. The toes may have unusual or irregular proportions in relation to each other. The feet and legs are often cold and blue and show evidence of imperfect circulation.

The deep reflexes were in all of Bullard's cases normal (25 cases). Fennell reports that out of 20 cases they were brisk in 9, normal in 6 and absent in 5.

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